This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`

STANFORD UNIVERSITY
LIBRARY
Exchange
Account

TRANSACTIONS

OF

THE CANADIAN INSTITUTE.

VOLUME IV., 1892-93.

TORONTO:

PRINTED FOR THE CANADIAN INSTITUTE,

BY THE COPP, CLARK COMPANY, LTD., COLBORNE ST.

1895.

STANFORD UNIVERSITY
LIBRARY
Exchange
Account

TRANSACTIONS

OF

THE CANADIAN INSTITUTE.

VOLUME IV., 1892-93.

STANFORD LIBRARY

TORONTO:

PRINTED FOR THE CANADIAN INSTITUTE

BY THE COPP, CLARK COMPANY, LTD., TORONTO

1895.

611789

STANFORD LIBRARY

OFFICERS

OF

THE CANADIAN INSTITUTE,

1892-1893.

President:
ARTHUR HARVEY, Esq.

Vice-President:
A. B. MACALLUM, Ph.D., M.B.

Secretary - - - - - ALAN MACDOUGALL, M. Can. Soc. C.E.
Treasurer - - - - - JAMES BAIN, Jr., Esq.
Librarian - - - - - D. R. KEYS, M.A.
Curator - - - - - DAVID BOYLE, Ph.B.
Editor - - - - - GEORGE KENNEDY, M.A., LL.D.

Members of Council:

O. A. HOWLAND, Esq.
L. J. CLARK, Esq.
A. BLUE, Esq.
JAMES H. PEARCE, Esq.
JOHN MAUGHAN, Esq., *Chairman of the Biological Section.*
J. B. WILLIAMS, Esq., *Secretary* " "
J. C. HAMILTON, LL.B., *Chairman of the Historical Section.*
B. E. WALKER, Esq., *Chairman of the Geological and Mining Section.*

Assistant Secretary and Librarian:

R. W. YOUNG, M.A.

CONTENTS.

PAGE

Officers, 1892-93 iii

Notes on the Western Dénés 1
REV. A. G. MORICE, O.M.I.

Transactions—Session 1892-93 223

Forty-Fourth Annual Meeting 244

Forty Fourth Annual Report 245

Social Organization of the Blackfoot Indians 249
REV. JOHN MACLEAN, M.A., PH.D.

A New Reading of the Buddhist Inscriptions of India (Plates I., II., III., IV.).. 261
REV. JOHN CAMPBELL, LL.D.

The Journal of Captain Walter Butler on a Voyage along the North Shore of Lake Ontario, from the 8th to the 16th of March, 1779 279
CAPT. ERNEST CRUIKSHANK.

Memoir of Captain Walter Butler 284
CAPT. ERNEST CRUIKSHANK.

Early Traders and Trade Routes, 1760-1782. (Second Paper) 299
CAPT. ERNEST CRUIKSHANK.

Note on a Memorable Epoch in Canadian History 314
SANDFORD FLEMING, LL.D., C.M.G.

The Present Aspect of the Ossianic Controversy 319
REV. NEIL MACNISH, B.D., LL.D.

Niagara Library, 1800-1820 336
JANET CARNOCHAN.

Notes on the History of the Amalgamation Process 357
ROBERT DEWAR.

[The Editor is requested to state that the specimen of *Pinicola Enucleator* mentioned in Vol. I., page 41, No. 7, was captured by Mr. E. E. Thompson.]

TRANSACTIONS

OF

THE CANADIAN INSTITUTE,

SESSION 1892-93.

NOTES

ARCHÆOLOGICAL, INDUSTRIAL AND SOCIOLOGICAL,

ON THE

WESTERN DÉNÉS

WITH AN ETHNOGRAPHICAL SKETCH OF THE SAME

BY THE REV. FATHER A. G. MORICE, O.M.I.

Read 4th November, 1893.

CONTENTS.

PAGE

Introduction 5

CHAPTER I.

Ethnological Sketch 8
The Name "Déné" 8
Distribution of the Dénés 10
Main Characteristics of the Déné Race 17
Distribution of the Western Dénés 22

CHAPTER II.

Preliminaries 32
Philological 32
Works and Implements Unknown Among the Western Dénés 35

CHAPTER III.

Stone Implements 39
Industrial Stone Implements 43
Stone Weapons of War and of the Chase 53

CHAPTER IV.

Bone and Horn Implements 66

CHAPTER V.

Traps and Snares 84
Fish Traps 84
Land Animal Traps 93
Snares 98
Observances of the Hunter and Trapper 106

CHAPTER VI.

Wooden Implements 111

CHAPTER VII.

Bark Implements 120
Esculent and Medicinal Plants 127
Other Bark Implements 132

CHAPTER VIII.

Copper and Iron Implements 136
Copper Implements 136
Iron Implements 140

CHAPTER IX.

Skin Objects, and Twined and Textile Fabrics 145
Skin Objects 145
Objects of Mixed Material 150
Textile and Twined Fabrics 156

CHAPTER X.

Dress and Personal Adornment 162
Common Dress 162
Ceremonial Costume 172

CHAPTER XI.

Habitations 184

CHAPTER XII.

Monuments and Pictography 199
Carved Monuments 199
Pictography 206
Index 213
Works quoted or referred to 219
Addenda et Corrigenda 221

INTRODUCTION.

"Archæological" is rather inappropriate in connection with the present monograph, whose scope embraces nothing archæan or really ancient. The prehistoric Dénés are the Dénés of but yesterday. For, what are the one hundred years which have elapsed since the discovery of their country compared with the twenty or more centuries which separate us from the famous civilizations of ancient Egypt and Assyria? Yet, to check possibly too sanguine expectations from such archæologists as may happen to read these lines, I hasten to declare that it is perhaps more easy to present the lover of technological lore with graphic illustrations of the arts and industries which flourished among the subjects of the Pharaohs and the Assyrian monarchs, than to thoroughly illustrate from actual specimens the *ensemble* of the arms, working implements, household utensils and ceremonial paraphernalia, which should concur in reconstructing the peculiar mode of life pursued by the primitive Dénés. The original Egyptians and Assyrians have left us, besides authentic records of their own doings on imperishable material what promises to prove well nigh unlimited stores of practical illustrations of their past sociology in their tombs, their temples and other public monuments. So that the antiquarian's task is greatly facilitated by the abundance of the material at his command. Furthermore, where the hieroglyphic and cuneiform chronicles fail to clear up difficulties of interpretation or to enlighten him on the particular use of ancient implements, he has only to delve into Herodotus and other historians for the desired light.

Not so, however, with regard to the prehistoric Dénés. As I have elsewhere demonstrated,* that family of American aborigines, and more especially the Carrier tribe to which prominence will be given in the following pages, is characterized by a wonderful power of imitation and self-adaptation which prompted it, upon the advent of the whites, to discard most of its native customs, indigenous weapons and working implements. As a natural consequence, many of the latter are now in a fair way towards complete obliteration. Moreover, the nation's historians, I mean the old men who witnessed the manufacture and use of some archæological articles the duplicates of which have caused speculations from more than one antiquarian, are fast disappearing from

*"Are the Carrier Sociology and Mythology Indigenous or Exotic?" Trans. Roy. Soc. Canada, Section II. 1892.

the scene of this world. So that the sooner the Déné technology is brought to light, the better it will be in the interest of science.

Indeed, should any value whatever be attached to the present monograph, I feel quite certain that it will be entirely on account of its opportuneness. Undertaken twenty-five years ago, it could probably have been made more exhaustive. After the lapse of an equal space of time, its usefulness as a contribution to archæological knowledge would be problematical. I am at present the possessor of the only remaining specimens of some objects illustrative of the past Carrier sociology, and my familiarity with the language and original customs of the Indians to whose spiritual wants I minister, might not be enjoyed by a successor among them until time and circumstances deprive its use of much of its value.

These considerations, corroborated by the requests of scientists whose advice I have not the right to disregard, have emboldened me to attempt a description of such technological objects as can be illustrated from specimens in my possession or which are still in common use among the Western Dénés. The number of these, as will soon appear, is somewhat limited, and therefore my task cannot be very arduous. I only regret that my mineralogical shortcomings render an exact description of the material used in the fabrication of stone implements in a few cases impossible. For the identification of such rocks as are adequately described, I am under obligation to Dr. G. M. Dawson, Assistant Director of the Geological Survey of Canada, Ottawa.

As technology is the prime object of this monograph, the industries of the Western Dénés will be mentioned in so far only as may be necessary for the clear understanding of the nature and use of the objects therein described. Which statement should not convey the idea that I intend to make light of their claims to importance in an ethnological contribution. With a little reflection, it will become apparent that all human industries need material aids or means to manifest themselves, and their results must also take a concrete form. Now, these palpable data, be they the products of human ingenuity or the instruments employed in their development, are *per se* technological items, and by reviewing the latter, one cannot help treating of the former. Therefore I simply mean to say that the archæological, rather than the industrial, plan will be adopted in the following pages. In other words, our divisions shall be based, not on the industries of the Western Dénés, but, as far as practical, on the material of the weapons, tools, utensils, fishing devices and other implements under consideration.

As for the third, or sociological scope of this paper, I think that our title will be justified not only by numerous transient mentions of native customs and practices, but more especially by extended descriptions of the Aborigines' usages and superstitions in connection with fishing and trapping, their domestic economy as regards diet and remedies, their ceremonial dress, their habitations, etc. However, for more systematic information concerning the Déné sociology, the reader must be referred to another paper published some years ago under the title of "The Western Dénés; their Manners and Customs." *

Mythology may be regarded as a mirror wherein the psychological ideas and the particular social institutions and mode of life of a people are faithfully reflected. Therefore I have not deemed it inconsistent with the nature of my subject to intersect the following pages with a few short legends or traditions, especially when these may prove a help towards the formation of a more correct idea of the objects hereafter described.

* Proceedings Can. Inst., vol. vii., p. 109, *et seq.*

CHAPTER I.

ETHNOLOGICAL SKETCH.—THE NAME "DÉNÉ."

For the benefit of such of my readers as may not have seen my former essays, I must repeat that by Dénés I mean that large family of American Aborigines commonly known under the names of Tinné, Tinneh, Tenni (Bompas), Tenne (Kennicot) and Athapaskans. As I have already pointed out elsewhere, all of these appellations are inappropriate. For more reasons than one, they should, in my estimation, be discarded in favour of "Déné." Neither Tinné nor Tinneh have any meaning in the dialect of the many tribes into which that extensive stock is divided. The ethnologists who are responsible for these nicknames gathered them from the desinence of several tribal names probably badly pronounced, and certainly misspelt, by the earliest *voyageurs* or traders who made mention of these Aborigines. The verbal suffix *'Tinne*, or *'Tenne*, is evidently the term they aimed at rendering. Now to the native ear the difference between T and 'T is infinitely greater than is with us that which exists between such letters as W and G, since these are commutable in the Aryan languages,* while the former are not in the Déné dialects. Thus, in Carrier, *ta* means "lip," and *'ta* "feather;" *to* means "up," and *'to* "nest;" *tis* stands for "younger sister," and *'tis* for "coals;" *taz* is the root for "heavy," and *'taz* signifies "backward;" *nəstaih* is equivalent to "I dance," while *'nəs'taih* means "I ripen." These contrasts could be multiplied almost *ad infinitum.*

Furthermore, 'Tinne, being a suffix, cannot stand without its verbal support. Thie would-be noun is composed of the root of the verb *hwos'ten* (or *kwos'tin*, etc., according to the dialect) which means "I inhabit," and the personal plural particle *ne* (or *ni*) resulting in the verbal noun *hwo'tenne* (or *kwo'tinni*, etc.) "inhabitants," which when suffixed to a name of river is contracted into *'tenne*, etc., as in *Naz-Koh-'tenne*, *Tsiɂ-Koh-'tinni.* Thus this pretended word corresponds in every particular—save that in Déné it is a verbal not substantive, affix—to the final *-enses* of Lugdunenses, Massilienses, Carthaginienses, Colossenses, etc. Now who ever dreamt of denominating by that final the latin speaking peoples? Who would, for instance, call *Ens* the French nation

* As is evident from the conversion of William into Gulielmus, Guglielmo, Guillermo, Guilherme and Guillaume; of War into Guerre and Guerra, etc.; of Warrant into Garantir, etc.

because it designates as Parisi*ens* the inhabitants of Paris; as Londoni*ens* those of London, etc.? Yet the identity of the two cases is so evident that I need only translate the above, and say London-hwo'tenne, Palî-hwo'tenne, to bring it home to the dullest intellect. As with the *-enses* and the *-ens* of the Italic tongues, so it is with the *'tenne* of the Dené idioms; it never applies but to names of places or at least of ethnographic divisions. Another point of similarity is that it varies with the dialects, being *'tenne* in Carrier, *'tinni* in Tsiꞁkoh'tin, *'qenne* in Tsé'kéhne, etc.

Lastly the correct pronunciation of these word-endings requires a lingual explosion which cannot be obtained except by those already initiated into the mysteries of the Dené phonetics. Hence the absurdity of designating a whole nation by an accidental suffix, impossible of pronunciation to the great majority of the readers, which is no word of itself and changes according to the dialect of some twenty or more different tribes.

Another name no less widely used to denominate the Dené stock, and for which Gallatin is said to be responsible, is "Athapaskan." Now fancy the propriety of calling the whole British, not merely English, race, say Bristolians or Manchesterians! The Bureau of Ethnology of the Smithsonian Institution which has adopted this name in its official publications has to confess that "it has been objected to by a number of missionaries—students of various dialects of this family in the North-West—but," it is added, "priority demanded that Gallatin's name should be retained."* Methinks, however, that time cannot of itself convert a wrong into a right.

Rev. E. Petitot replaces either vocable by Dené-Dindjié, thereby "uniting in one compound word the southermost tribe, the Chippewayan or Dené, with the northermost, the Loucheux which calls itself Dindjié."† This name, which is undoubtedly a vast improvement on any of the above mentioned, and has the merit of containing two genuine Indian words, correctly spelt, has perhaps the disadvantage of unwittingly contracting in the mind of the reader the area covered by the nation thereby designated. The Chippewayans are *not* the most southerly branch of the family not only on the North American continent, but even within British America. The Tsiꞁkoh'tin and the Carriers inhabit a stretch of land several degrees of latitude more to the south and are nevertheless territorially connected, without any intervening gap, with all the North-

* Bibliography of the Athapaskan Languages, by J. C. Pilling, p. v.; Washington, 1892.

† *Monographie des Dené-Dindjié*, p. xix.; Paris, Leroux, 1876.

ern Déné tribes. Therefore, on his own basis of word formation, the abbé Petitot should call the whole race Təni-Dindjié,* not Déné-Dindjié.

But we should not overlook the numerous offshoots it has spread out through the Western and Southern States of the American Union, and whose term for "man," and consequently for themselves considered as aborigines, is practically identical with "Déné."† Why then should we not call the whole stock *Déné*, after the native name of the most central—taking into consideration the southern scattered tribes—and one of the most populous branches thereof?‡ We could perhaps find a precedent for this in the names of such European peoples as the Italian, the French and even the English, which came to be given the entire nation after they had long represented one of the most important of its original tribes, the Itali, the Franks and the Angles or Angli.

Despite their minuteness, the foregoing remarks have been deemed necessary since their substance, as embodied in a foot-note to a former paper by the writer does not appear to have received the attention he cannot help thinking it deserved at the hands of Ethnologists. Even the few who have noticed it now seem to labour under the impression that the Dénés are a branch of the Athapaskan family lately made known to the scientific world!§ Such is the force of habit! Others suppose that Tinne and Déné are the same word under two different dialectical forms.‖

DISTRIBUTION OF THE DÉNÉS.

No other aboriginal stock in North America, perhaps not even excepting the Algonquian, covers so great an extent of territory as the Déné. The British Isles, France and Spain, Italy and any two or three of the minor European commonwealths taken together would hardly represent the area of the region occupied by that large family. And yet it is no exaggeration to say that few American races are less known than the Northern Dénés who, in point of territory, constitute the main bulk

---

* *Təni* is the TsiɥKoh'tin word for "man."

† It should be remembered in this connection that in all the Déné dialects the vowels have almost no linguistic importance whatever, the quintessence of the words being condensed in the initial consonants of each syllable. Also, it may be worth noting here that T and D, P and B, G and K, etc., are commutable even within each separate dialect.

‡ The aboriginal race of the Alaskan littoral is called Tlingit after the word it uses to say "man." Why should this not also be the case with the Déné family?

§ The Athapaskan Bibliography, *passim*, 1892.

‖ Language as a test of Mental Capacity, by H. Hale. Transact, R. S. C., p. 81, 1891.

of the whole nation. West of the Rocky Mountains, they are to be found from 51° 30′ of latitude to the borders of the Eskimo tribes, while on the east side of the same range they people the immense plains and forests which extend from the Northern Saskatchewan down almost to the delta of the Mackenzie River. From West to East they roam, undisputed masters of the soil, over the almost entire breadth of the American Continent, though a narrow strip of sea shore country separates their ancestral domain from the waters of the Pacific and those of the Atlantic. With that unimportant restriction, they might be said to occupy the immense stretch of land intervening between the two oceans!

In the words of Horatio Hale, this is, east of the Rocky Mountains "a dreary region of rocks and marshes, of shallow lakes and treacherous rivers, offering no attractions except such as the hunter finds in the numerous fur-bearing animals which roam over it and afford the native tribes a precarious subsistence. When this resource fails, they live on lichens which they gather from the rocks."* West of the Rockies, the country inhabited by them is rugged and heavily timbered, dotted with numerous deep lakes, and intersected by swift, torrential rivers. Their staple food is venison and salmon, according to the geographical position of their tribal grounds.

I have already given, in a volume of the "Proceedings of the Canadian Institute,"† the names and habitat of the northern tribes together with their approximative population. Let me only remark that in that list I classed the Beaver Indians as a separate tribe merely to conform to the long established custom of the traders and missionaries. But as in America, Ethnography is based chiefly, if not entirely, on Philology, I must explain that, from a philological standpoint, the Beavers (*Tsa'tenne* in Carrier) are genuine Tsé'kéhne. The idiomatic differences noticeable in the speech of these two artificial divisions are not any more pronounced than those which exist between the dialects of the Lower and the Upper Carriers. The reason the Beavers go by a distinctive name even among their congeners is that, being citizens of the plains, they cannot with propriety be called Tsé'kéhne or "Inhabitants of the Rocks" viz.: the Rocky Mountains.

For the perfect completeness of our aboriginal census, we should add to the above the Sarcees, a band of Tsé'kéhne who, upon a difference

---

*Language as a test of Mental Capacity, p. 81; Transact. R. S. C. Vol. IX., Sec. II, 1891.

†The Western Dénés, etc., Proc. Can. Inst. Vol. VII., p. 113.

arising from a trivial offense,* separated, not very long ago from the main body of the Dené nation and were adopted by the Blackfeet, an Algonquian tribe, among whom they have since lived, while keeping their linguistic autonomy. They do not number more than 100 souls.

An ethnologic problem which is not yet, and will perhaps never be solved, is the question, How did it come to pass that large portions of the Dené nation detached themselves from the main stock and migrated south? When did this exodus occur? What was the route followed by the adventurous bands? The man is probably yet unborn who will satisfactorily answer these questions. It may be that the interested tribes have some legends or traditions which might throw some light on the subject; but I think this is hardly the case.† As far as the northern Dénés are concerned, they do not even suspect the existence of any kinsmen south of the Tsi|Koh'tins' territory. Two facts only seem pretty safely established, namely: the separation of the southern from the northern tribes happened centuries ago; and, moreover, the national movement resulting in the division of the nation into two different camps was from north to south. The first assertion is proven by the fact that "when the Spaniards first met them [the Navajos] in 1541, they were tillers of the soil, erected large granaries for their crops, irrigated their fields by artificial water-courses or *acequias*, and lived in substantial dwellings, partly underground."‡ In support of the second statement, I need only refer to a tradition current among some western tribes according to which "days were formerly exceedingly short; so short indeed that sewing the edge of a muskrat skin was all that one woman could do between sunrise and sunset." This unmistakably points to the arctic regions as places of previous residence.

Unknown to themselves, important branches of the great Dené tree thrive thousands of miles away from the parental stem. As far as I can ascertain from the latest and most reliable source§ available, they are, or were until recently:—

---

* According to Mr. W. E. Traill, an H. B. Co's officer who has passed many years in close proximity to the Sarcees, this separation was caused by the following circumstances: A party of Tsé'kéhne were target shooting when a dog happened to take on the arrow planted in the ground as a target one of those liberties of which the canine gent is so fond. Thereupon the dog was shot by the possessor of the arrow, upon which that of the shooter was killed by the master of the original offender. Then followed numerous reprisals which could only be stopped by the voluntary departure of one band of related families which became the Sarcees.

† The above had been written for some time, when I read in Dr. Brinton's *American Race* that "the Navajos have no reminiscence of their ancestral home in the North."

‡ Brinton's *American Race*, p. 72, citing A. A. Bandelier "Indians of the Southwestern U. S."

§ 60th Annual Report Commissioner of Indian Affairs, 1891.

1. The Kwalhiokwas*, the Umkwas and the Totunies in Oregon. The Report of the Commissioner of Indian Affairs, for 1891 (Vol. II., p. 82), gives 78 as the number of the Umkwa population in the Grande Ronde Agency, with additional, though undetermined, numbers in the Siletz Agency. According to the same authority, the Totunies on Rogue River aggregate 47, while their congeners on the Siletz reserve cannot be numbered owing to their intermarriages with alien tribes.

2. The bands respectively called Hoousolton, Miscolt, Hostler, Matilden, Kentuck, Tishtangatang and Siaws in California†, but better known under the collective name of Hupa, from that of their common reservation in the Hupa Valley. They aggregate 492.

3. The Wailáki, likewise on the Pacific (Gatschet), numbers unknown.

4. The Navajos, in Arizona, the most populous and flourishing of all the Dené tribes, since they number, according to the latest and most accurate accounts, no less than 16,102 souls.‡

5. The various tribes of Apaches of which the following is a list showing their habitat and present population :—

(a)	The Oklahoma Apaches, in Oklahoma Territory	325
(b)	The Jicarilla Apaches, in Colorado.....	824
(c)	The Mescalero Apaches, in New Mexico	531
(d)	The White Mountain Apaches, in Arizona.....	130
(e)	The Coyotero Apaches, in Arizona.....	423
(f)	The San Carlos Apaches, in Arizona.....	831
(g)	The Tento§ Apaches, in Arizona.....	760
(h)	The Apaches of Camp Apache, in Arizona.....1,878	

* Contradictory statements and apparently misapprehension as to the names and present status of the Southern Pacific Coast Dénés render an exact classification of them difficult. Thus Mr. Horatio Hale (*Language as a Test of Mental Capacity*, p. 85, 1891) speaks of the Kwalhiokwas as still lingering in one of the Pacific States, while Dr. A. S. Gatschet, in his work on "The Klamath Indians of Southern Oregon, Vol. I. p. 45," published one year *earlier*, states that they have disappeared together with the Tlatskanai, another Dené tribe. The same ethnographer mentions side by side (*op. cit.*) with the Hupas the Wailáki, reference to whom I find in no other author. The Totunies are called Totutunies by H. Hale (*op. cit.*), Tututenas by Dr. Brinton (*op. cit.*), Tootoonas by Mr. Morgan (*60th Ann. Rep.*), Tutatamy by P. de Lucy-Fossarien (*Extrait du Compte Rendu stènographique du Congrès international des sciences ethnographiques ....Etude de philologie ethnographique par M. P. de Lucy-Fossarien, Paris, 1881*).

† After Prof. O. Mason (*The Ray Collection from Hupa Reservation*, pp. 206, 207).

‡ According to Horatio Hale (*Language as a Test, &c.*, p. 90), that tribe was erroneously thought to number in 1889 as many as 21,000 members.

§ These are not all pure Dénés, many being mixed with the neighboring tribes, or even altogether aliens as to the race to which they belong.

In Mexico, the number of Apaches is doubtful, since, according to Dr. D. G. Brinton, "although the Mexican census of 1880 puts the Mexican Apaches at 10,000, no such numbers can be located."* The same author then goes on to state on the strength of information emanating from Mr. Henshaw, of the Smithsonian Institution, that "the only Apache band now known to be in Mexico are the Janos or Janeros in Chihuahua, made up of Lipans and Mescaleros.†

6. The Lipans, in New Mexico, who have dwindled down to forty individuals. Their original home appears to have been on the Rio Grande.‡

It would not be pleasant to be represented as playing the role of the carping critic. Yet even the fear of appearing to merit this uncomplimentary epithet, cannot deter me from pointing out how utterly meagre and unreliable are the data possessed, even at the present time, by the best ethnographers relatively to the Dené stock. Despite the correct list of the Northern tribes given by the writer in the last volume of the "Proceedings Canadian Institute," I find that Dr. D. G. Brinton in his recent book "The American Race," published at Washington two years after the aforesaid classification had been printed in Toronto, omits no less than six Dené tribes of the great northern division. To show how utterly mixed ethnography appears to be when it is a question of locating the various Dené tribes, and thereby to excuse the details into which I find myself obliged to enter, I take the liberty of quoting the following sentences from the above mentioned work:—

"These [the Dénés] extend interruptedly from the Arctic Sea to the borders of Durango, in Mexico, and from Hudson Bay to the Pacific. . . The Loucheux have reached the mouth of the Mackenzie River, the Kuchin are along the Yukon, the Kenai on the Ocean about the peninsula that bears their name, while the Nehaunies, Sekanies and Takullies are among the mountains to the south. The Sarcees lived about the southern head waters of the Saskatchewan." §

Now, with all the deference due to such a veteran ethnographer as Dr. Brinton, truth bids me state that:—First, It is almost absolutely certain that no branch of the Dené family is stationed on the Arctic Sea, the whole coast of which is occupied by Eskimo tribes. Second, There

* "The American Race," p. 69, Washington, 1891.

† *Ibid.*

‡ *The Karankawa Indians*, etc., by A. S. Gatschet; Cambridge, Mass., 1891.

§ The American Race, pp. 68, 69.

are no Dénés on the Hudson Bay any more than on the Pacific. The former is peopled on the north by the Eskimos and on the south by tribes of Algonquian parentage, while several alien races cover the whole northern coast of the latter, With, perhaps, a single insignificant exception.* Third, The Loucheux and the Kuchin are one and the same tribe under different names, the first being that originally applied to it by the French-Canadian voyageurs, while the second (which should read Ku-tchin or Ku-t'qin, the last syllable being *exploded* with the tongue and teeth) is more in honour among English-speaking ethnographers. The latter vocable is the exact equivalent of the Carrier "hwo'ten", the Tsé'kéhne "hwot'qen", the Tsi|Koh'tin "kwo'tin", all of which, as we have already seen, signify "Inhabitants." Fourth, The Kenai spoken of by Dr. Brinton are probably the K'naia-Kho-tana of Dr. Powell and both authors may be right in placing their habitat on the Pacific Ocean. Yet it must be admitted that this would be more evident, were not Dr. Brinton to transport it, ten pages further on, among the immense plains claimed by the Blackfeet as their ancestral home.† 5th, The would-be Nehaunees, Sekaunies and Takullies call themselves Nah'ane, Tsé'kéhne and Ta|Kɛ|ne respectively. 6th, The Sarcees *now live* about the southern head waters of the Saskatchewan, but formerly *lived* some degrees further north among the Beaver Indians with whom they are congenerous, even as a subdivision of the Tsé'kéhne tribe.

Nothing but a desire of serving the interests of ethnological science has prompted the above remarks. That I can prove all I advance will not be doubted by those who are cognizant of the opportunities I enjoy of ascertaining the real ethnologic status of the tribes by which I am surrounded or of those which are so closely related by blood and language with that among which I now live. The inaccuracies which they are aimed at correcting must also be my excuse for venturing to present below the list, as complete as I can make it, of all the Déné tribes. A very few of the southern tribes may be unwittingly omitted; but I would rather sin by omission than by exaggeration. All the northern tribes

* This is the *K'naia-K'ho-tana* who are now said to reach the coast on Cook's Inlet (Dr. Powell's "Indian Linguistic Families," 7th Ann. Rep. Bur. Ethnol.). But the fact that this learned ethnographer associates thereto the "Ahthena" of Copper River renders the identification of that tribe somewhat doubtful, inasmuch as the "Ahtena," unless they are misnamed, must be exogenous to the Déné stock, since that very name means in Déné "foreigners," and is used by our aborigines to designate all Indians of non-Déné stock. K'naia-Kho-tana, however, seems to have the right linguistic ring about it, and apparently refers to the "people of the river K'naia," whatever this last noun may mean.

† "Their [the Blackfeet] bands include the Blood *or K'enai* and the Piegan Indians" p. 79. The italics are mine.

are given without an exception, though I do not detail the ramifications or subdivisions of the Loucheux, and therefore omit any mention of the Kenai or K'naia-Kho-tana. The figures represent the population of each tribal division. In the case of the southern tribes they are compiled from the latest official accounts available. For the north-eastern divisions they are those of Rev. E. Petitot corrected down to date by Mr. Rod. Macfarlane, an H. B. Co's officer who has passed over 40 years of his life among the Indians he enumerates. I am myself responsible for the figures representing the numbers of the north-western tribes.

CLASSIFICATION OF THE DÉNÉ TRIBES.

NORTHERN DÉNÉS.

	About
Loucheux: Lower Mackenzie River and Alaska	4,400
Hares: Mackenzie, Anderson and MacFarlane Rivers	600
Bad-People: Old Fort Halkett	200
Slaves: west of Great Slave Lake and McKenzie River	1,000
Dog-Ribs: between Great Slave Lake and Great Bear Lake	1,000
Yellow-Knives: north-east of Great Slave Lake	500
Cariboo-Eaters: east of Lake Athabaska	1,200
Chippewayans: Lake Athabaska, etc.	3,000
Tsé'kéhne: both sides of Rocky Mountains	500
Beavers: south side of Peace River	700
Sarcees: east of Rocky Mountains, 51° lat. north and south.	100
Nah'ane: Stickeen River and east	700
Carriers: Stuart's Lake, north and south	1,600
Tsiɣoh'tin: Chilcotin River	460

SOUTHERN DÉNÉS.

Umkwas, Totunies and (?) Kwalhiokwas: Oregon	150
Hupas: Hupa Valley, California	492
Wailákis: Northern California	(?) 130
Navajos: Arizona	16,102
Apaches: Oklahoma, Colorado, New Mexico and Arizona	5,702
Lipans: New Mexico	40
Total of the Northern Tribes	15,960
Total of the Southern Tribes*	22,616
Total of the whole nation*	38,576

* Exclusive of the problematic Kwalhiokwas, the Umkwas of the Siletz Agency, the Mexican Apaches, or any such bands as are not controlled, even remotely, by the office of the U. S. Commissioner Indian Affairs.

A tribe of Atnas, Adenas, Atnahs or Ahthenas, whose habitat would be the extreme north-west of this continent, is occasionally mentioned in ethnographic literature as belonging to the great Déné family. Pilling gives it a place in his "Bibliography of the Athapaskan Languages." There must be here a mistake either of name or of identification. "Atna," etc., is a Déné word which means "foreigner, heterogener," and is used to qualify *all* aboriginal races which are *not* Déné. Either then the Atnas of the travellers and ethnographers are not Déné, or if they belong to that race they must be misnamed.

MAIN CHARACTERISTICS OF THE DÉNÉ RACE.

If there is in the broad world a family of human beings which, though a mere subdivision of a larger group of the genus *homo*, plainly demonstrates, through the diversity of its many branches, the fallibility as ethnic criteria of all but one of the various sciences which go to make up Ethnology, this is most certainly the Déné family. Savants now-a-days seem too prone to study man as they would a mere animal. Perhaps they overlook too easily the fact that he is a rational being. If a part of the animal kingdom, he is there a king without peer; and to judge him after the same standard as we do the brutes of creation should be considered unscientific. We hear constantly of bodily measurements, of anthropometry and craniology. Now, without entering into the technicalities of these sciences, let us apply their test, I do not say to those portions of the Déné people which live thousands of miles apart, but to a few coterminous tribes of that nation.

On the Western slope of the Rocky Mountains live side by side three tribes, the Tsé-'kéhne, the Carriers and the Tsiɬ-Koh-'tin, which may furnish us with convenient material to experiment upon.

The Tsé'kéhne are slender and bony, in stature rather below the average, with a narrow forehead, hollow cheeks, prominent cheek bones, small eyes deeply sunk in their orbit, the upper lip very thin, and the lower somewhat protruding, the chin very small and the nose straight. Go and inspect them, and perhaps out of every ten men, five who have long been fathers will appear to you like mere children. I have never seen but one fat person among them and none that was bald.

Now the Carriers are tall and stout without, as a rule, being too corpulent. The men, especially, average 1^{m}, 660^{mm} in height. Their forehead is much broader than that of the Tsé'kéhne, and less receding than is usual with American aborigines. Their face is full, with a nose generally aquiline and in every case better formed than that of their heterogeneous neighbours; their lips are thicker and their chin more prominent than

those of the Tsé'kéhne. Their eyes are also much larger and of a very deep black. Baldness, though rare, is sometimes noticed among them, while a few are literally obese. I am very much mistaken if two crania, one of an individual of each of these tribes, would not be pronounced by a craniologist as belonging to representatives of diametrically different races.

The Tsi|Koh'tin, on the other hand, are short in stature, broad faced and broad shouldered, with prominent cheek bones, heavy jaws and a nose which is not uncommonly thick and flattish. They may be said to have some physical resemblance to the Chinese. This description applies also to the Babines, who might be considered as a branch of the Carriers.

The only points in common between the three tribes are the dark eyes, the black, coarse and straight hair and the small hands and feet. Large hands and feet, however, are occasionally met with among Carrier men.* I do not speak of the complexion, because it varies even in the same tribe according to the occupation and food of the natives. A hunter will never return from a tour of two or three months in the woods without being considerably bronzed, while his fellow tribesman who has remained at home, without being as white as a European, will yet be fairer complexioned than most individuals of the Salish race of the South. Even in the matter of beard, a notable difference is observable, inasmuch as full beards, dark and coarse, heavy with hardly any shaving, are by no means rare among the Babine sub-tribe, while the rest of the Western Dénés are remarkable for the scarcity, or sometimes the total absence, of facial hair.

If we now consider the Déné nation from a psychological standpoint, the contrast between its divers branches will be still more startling. The Northern Dénés are generally pusillanimous, timid and cowardly. Now, can this be said of the Apaches? The Northern Dénés are moreover lazy, without skill or any artistic disposition. Is it so with the Navajos? Even among our Carriers, the proudest and most progressive of all the Western tribes, hardly any summer passes off but some party runs home panic stricken, and why? They have heard, at some little distance, some "men of the woods" evidently animated by murderous designs, and have barely escaped with their lives. Thereupon great commotion and tumult in the camp. Immediately everybody is charitably warned not to venture alone in the forest, and after sunset every door is

* I have also seen several really fair-haired Carriers, a peculiarity which is so much the more remarkable as it certainly can not be ascribed to blood mixture with persons of Caucasian descent.

carefully locked against any possible intruder. Compare these puerile fears of the Carriers with the indomitable spirit, the warlike disposition of the "terrible Apache." Compare also the rude, unartistic implements, the primitive industries of the same tribes with the products of the Navajo ingenuity, their celebrated blankets and exquisite silverwork especially-and tell me if in this case psychology is a safe criterion of ethnologic certitude.

A noteworthy quality of the Northern Dénés, especially of such as have remained untouched by modern civilization is their great honesty. Among the Tsé'kéhne, a trader will sometimes go on a trapping expedition leaving his store unlocked, without fear of any of its contents going amiss. Meanwhile a native may call in his absence, help himself to as much powder and shot or any other item as he may need; but he will never fail to leave there an exact equivalent in furs. Now compare this naive honesty with the moral code in vogue among the Apaches. Read also what is said of the Lipans, another offshoot of the Déné stock: they "live in the Santa Rosa mountains from which they stroll about making inroads in the vicinity to steal horses and cattle."*

With regard to mental attainments and force of character, I have shown in a paper read before the Royal Society of Canada,† that all the north-western tribes, Nah'ane Carriers and Tsi[Koh'tin, which have come into contact with alien races have adopted the most prominent practices and customs of the latter. Such is, to a great extent, the case even as regards mythology. Nay more: they have gone as far as to borrow the language of their neighbours in connection with their traditional songs and ceremonies. On the other hand, many Tsi[Koh'tin and not a few Babines speak Shushwap or Kitikson, while not one full blood individual of the two latter stocks has acquired enough of the Déné languages to decently hold conversation through them. The Dénés think it a mark of enlightenment to imitate the alien races with which they have intercourse, while these show the little esteem they profess for them by calling them "stick savages."

Now hear what a competent authority says of the Dénés of North California: "Next after the Karoks, they are the finest race in all that region, and they even excel them in their statecraft, and in the singular influence, or perhaps brute force, which they exercise over the vicinal tribes. They are the Romans of North California in their valour and in their far-reaching dominions. They are the French in the extended

* The Karaukwa Indians, by A. S. Gatschet, p. 41; 1891.

† Are the Carrier Sociology and Mythology Indigenous, etc? Trans. R. S. C. Sec. II, 1892.

diffusion of their language. They hold in a state of semi-vassalage most of the tribes around them, exacting from them annual tribute in the shape of shell-money; and they compel all their tributaries to speak Hupâ in communication with them. Although most of these tributaries had their own tongues originally, so vigorously were they put to school in the language of their masters, that most of their vocabularies were sapped and reduced to bald categories of names."*

The Northern Dénés, who are eminently gentle in disposition, have generally shown a remarkable receptiveness. And this explains how it is that, with few exceptions, they are all to-day practical Christians, and conform to the customs of the whites as much as their social status will permit. In opposition to this, we find that the Navajos and the Apaches still hold to their superstitious beliefs and ceremonies, and keep themselves aloof of any civilizing influence. This is so true that when, some years ago, an effort was made by the U. S. Commissioner of Indian Affairs to secure a tract of land close by the Cherokees' territory for the location of the Navajos, the former who, as is well known, have made great strides towards civilization, refused to entertain the proposition, "asserting that the Navajos were not civilized Indians."† I have never noticed any mention of real improvement in their midst since that time.

As for the Hupas, their agent stated ten years ago that they "are not to-day any more enlightened, advanced, progressive, industrious or better off in any way than they were when the Reservation was established, about twenty years ago."‡ That time has brought no change in their dispositions is made clear by the following words of their agent in his latest Report (1891): "They all cling to their own customs and laws as being far better than any others, and seem to look upon many of them as sacred. . . . Many of the Indians seem to look upon the attendance of their children [at school] as a favour to the teacher or the agent, and expect some reward for it."§ In strong contrast to the indifference for intellectual attainments manifested by the Hupas, let me refer the reader to what I said in a former essay‖ of the craving for knowledge evidenced by our Carriers, and the remarkable results it has produced even under the most untoward circumstances.

---

* Contributions to North American Ethnology, vol. iii., p. 72.

† The Cherokee Nation of Indians, by Ch. C. Royce, Fifth Annual Report, Bureau of Ethnology, Washington, 1883-84.

‡ Indian Affairs Report, 1881, 6; *apud* O. E. Mason's The Ray Collection, p. 207.

§ Sixtieth Annual Report Commissioner Indian Affairs, 1891, vol. I, p. 220.

‖ The Western Dénés; Proc. Can. Inst., vol. vii., p. 165.

Again, the folk-lore of the North-Western Dénés greatly differs from that of their immediate Eastern neighbours and congeners, while there is no point of affinity between that of either divisions and the mythology of the Navajos.

How is it then that tribes of aborigines occupying so widely separated territories and so utterly dissimilar from a psychological, technological, sociological and mythological standpoint can be classed under one single denomination as Dénés? The answer is in every mouth: this is owing to linguistic analogy. Language, therefore, is the *trait-d'union* which unites into one homogeneous body such apparently heterogeneous elements. Through it we are certain that the same blood flows in their veins, and that they are the children of a common father, whoever he may have been. If any stronger argument can be adduced in support of the paramount importance of Philology as an ethnological criterion, I am at a loss to discover what it can be.

Hence it will be seen that my initial remarks concerning that class of modern scientists who lay so much stress on the physical structure of man to the detriment of his special characteristic as a distinct genus, thinking and speaking, were not unwarranted. If even the *ensemble* of the peculiarities which differentiate him into a rational, social being cannot lawfully claim the first place in the ethnologist's estimation, *a fortiori* this cannot be granted to those features which he possesses in common with non-human animals. In the words of Horatio Hale, "the grand characteristic which distinguishes man from all mundane beings is articulate speech. It is language alone which entitles anthropology to its claim to be deemed a distinct department of science."* One needs not be a scientist to see the correctness of this view, and it is a long time since Quintilian said: "When the Creator distinguished us from the animals it was especially by the gift of language.... Reason is our portion, and seems to associate us with the immortals; but how weak would reason be without the faculty to express our thoughts by words, which faithfully interpret them! This the animals want, and this is worth more than the intelligence of which, we must say, they are absolutely deprived." †

I have not so far been fortunate enough to come across any vocabulary of a southern Déné dialect, and the only continuous Navajo texts I have ever seen are those of the "Mountain Chant" published by Dr. W.

* Language as a Test of Mental Capacity, by H. Hale; Transact. R.S.C., Vol. IX., p. 77, 1891.

† Quintilian, translated by La Harpe, Dijon, 1820.

Matthews.* Now, clothing these texts with the orthography denotive of the peculiarly exploding and sibilant sounds, which I think they must receive to become correct renderings, I find side by side, with some terms proper to the tribe or borrowed from adjacent stocks, no less than seventy-two words which are easily recognizable here, at a distance of perhaps 2,000 miles from the nearest Navajo. To form a just idea of the proportion of genuine Déné with local or foreign words, it should be borne in mind that these texts are composed merely of a few words very often repeated.

DISTRIBUTION OF THE WESTERN DÉNÉS.

Now that we have made some acquaintance with the divisions and main traits of the Déné nation in general, we may particularize and furnish the reader with more precise ethnologic data concerning the tribes whose technology and industries we are about to review. These we have already named: they are the Tsi|Koh'tin, The Carriers and the Tsé'kéhne. As some savants have done me the honour of asking for more detailed information on their ethnographic status than were contained in a former paper on the same, I shall now proceed to give their tribal subdivisions or septs, together with their aboriginal names, the habitat of the natives thereby determined and, as far as practicable, their present population, and the number of their villages.

West of the Rocky Mountains we have from south to north:—

The *Tsi|Koh'tin*, who actually inhabit the Chilcotin valley and roam over the bunch grass covered plateaus that skirt it on either side, from the 50° to the 52° 30′ of latitude north. Their territory is bordered in the east by the Fraser River, and in the west by the Cascade Range of mountains. But not unfrequently a few bands manage to cross over and make inroads for hunting purposes into the territory of the Sisha| and other coast tribes. Of course the latter resent these encroachments upon their ancestral domains; but as hunting for peltries is not extensively practised by them, the harm done by the poachers is not very great.

It is perhaps worth remarking in this connection that the "Linguistic Map of British Columbia" prefixed to Dr. F. Boas' Report on the B. C. tribes for 1890† is somewhat inaccurate in that it gives the Tsi|Koh'tin quite a tract of land on the east side of the Fraser which, as a matter of fact, is now and has been occupied from time immemorial by three villages of Shushwap Indians, viz.: Soda-Creek, Sugar-Cane and Alkali-

* Fifth Ann. Rep. Bureau of Ethnology, 1883-84.

† Sixth Report on the N. W. Tribes of Canada, London, 1890.

Lake. Nay more, until recently the Tsi|Koh'tin did not even extend as far as the Fraser. Some 25 years ago the bulk of the tribe inhabited Na'kûnt'|ûn, a village on the lake of that name (52° 40′ lat. by 125° 5′ long.) close by the Bilqulas' territory, whence they migrated almost in a body to the more fertile lands they now occupy.*

From a sociological standpoint they might be divided into the quasi-sedentary and the nomadic Tsi|Koh'tin. The former dwell on the north banks of the Tsi|Koh, called by the whites Chilcotin River. They are divided into two groups, viz.: the *Tɉɔs-Koh-'tin* (people of the Splint River) with one village on that creek close by the Fraser, population about 75; and the *T'ɉâ-theñ-Koh-'tin* (people of the river that trails through the grass) who have two villages near the Chilcotin 35 and 45 miles respectively west of the Fraser. Total population 190. An independent band of some 35 individuals, an offshoot of the same sub-division, has established itself near the Fraser facing Fort Alexander.

All of these Tsi|Koh'tin have abandoned their original semi-subterranean huts to dwell in log houses covered with mud according to the fashion prevailing among the neighbouring whites. They also cultivate wheat and other cereals, peas and potatoes with moderate success.

The nomadic Tsi|Koh'tin are called by the whites "Stone Tsi|Koh'tin" by allusion to their fovourite haunts, the rocky spurs of the Lillooet mountains and of the Cascade range where they live, largely on marmots. They have no fixed abode and except during the winter, they are constantly shifting from their southern to their northern borders, that is from the aforesaid mountains to the Chilcotin River, where they generally pass a few weeks of the fair season. I know of no more primitive people throughout the whole of British Columbia.

Apart from the above regular subdivisions their still remain at Na'kûnt'|ûn, or in the proximity of that lake, a few straggling members of the same tribe.

In his late paper on "the Shushwap people of British Columbia," Dr. G. M. Dawson gives† after Mr. J. W. Mackay, Indian agent, an interesting account of a hostile excursion of Tsi|Koh'tin warriors into the country of

* Were native testimony regarded as an insufficient proof of this, philology might still furnish us with corroborative evidence of unquestionable character. Thus the most remarkable feature of the present territory of the Tsi|Koh'tin tribe is its magnificent bunch grass (*Agropyrum* [*Triticum*] *repens* L.). Now they call it *Œnna-t'ɉâ*, or "grass of the foreigners," *i.e.*, the Shushwap. This particular species of grass is not met with north of the valley and borderiug tablelands of the Chilcotin River.

† Notes on the Shushwap people of B. C.; Transact. R. S. C. Sec. II, p. 24, 1891.

the Shushwap. On the authority of that narrative, the would-be invaders were pushed back by superior numbers into the Semilkameen valley where, by their prowess, they compelled their pursuers to come to terms and make a treaty of peace from which intermarriages soon resulted. "These strangers, who are said to have come from the Chilcotin country, are thus the earliest inhabitants of the Semilkameen valley of whom any account has been obtained." * Seven, out of thirteen words given by Mr. Mackay, as remnants of the original language of the invaders, are undoubtedly Tsi[Koh'tin, and make it certain that the Semilkameen Shushwap are partly of Déné parentage.

Immediately north of the Tsi[Koh'tin we find the Carriers or *Takhe[ne*, the most important in numbers, most widespread and progressive of all the north-western Déné tribes. They extend as far north as the 56° of latitude and are coterminous with the coast tribes on the west and the Crees and Tsé'kéhne on the east. The Coast Range on the one side and the Rocky Mountains as far as 53° lat. on the other, separate them from their heterogeneous neighbours. North of the 53°, they are in immediate contact with the Tsé'kéhne.

The Carriers are semi-sedentary Indians. They have fixed homes in regularly organized villages from which they periodically scatter away in search of the fish and fur-bearing animals on which they subsist. From south to north, their tribal subdivisions are :—

1. The ⌐thau'tenne (a contraction of ⌐tha-koh-'tenne, people of the Fraser River). They now have but one village, Stella (the Cape) contiguous to the old Fort Alexander, formerly one of the most important of the H. B. Co's. posts in British Columbia, now abandoned. They were originally several hundreds: they are now almost extinct as a sept. Whiskey and loose morals owing to the vicinity of the whites are responsible for this result. They are co-terminous with the Shushwap in the south and the Tsi[Koh'tin in the immediate west. I do not think that fifteen individuals of that sept now remain.

2. The *Nazku'tenne* (people of the river *Naz*). They are likewise greatly reduced in numbers, there not being actually more than 90 members of that sub-tribe, though they still inhabit two villages Quesnel and Black-Water.† The same causes, especially the former, as played havoc among the ⌐thau'tenne, are slowly but surely working out the

* *Ibid.* p. 25.

† The Black-Water or West River followed up by Sir. A. Mackenzie to reach the Pacific Coast.

ultimate destruction of the Nazku'tenne. Both villages inhabited by them are on the Fraser River.

3. Due west of the Black-Water village and ascending the river of that name to its source, we meet with a third subdivision of the Carriers, the *Nu-tca-'tenne* (probably corrupted from *Nu-tcah-'tenne*, people down against the island). These people dwell in four small villages, Trout Lake, ʇus'kəz,* Pe-ɬ'ka-tcék,† and ʇ'ka-tco.‡ The latter is composed of a mixed population of Déné and Belqula descent whose first white visitor was the writer, ten years ago. The Nu-cha-'tenne formerly had several other villages (Tsitsi, ʇrak, etc.), the sites of which are still discernible through small clearings in the forest. Their present total number may be a little over 135.

4. Immediately north of the Black-Water village, at the confluence of the NutcaKoh with the Fraser River, we have one village, Fort George or *ʇeitli*,§ the population of which forms one separate sept, the *Tano-'tenne* (people a little to the north). It numbers actually 130 persons. The Fort George Indians have on the east side of the Fraser very large and productive hunting grounds as far as, and comprising, the Rocky and Caribou mountains and spurs thereof. A village of the same sept, Tcinlak at the junction of the Na'kralKoh or Stuart's Lake River with the NuchaKoh had formerly a flourishing population which was, not very long ago, practically annihilated in one night by the TsiɬKoh'tin.

5. Two villages on Fraser Lake furnish us with our fifth tribal subdivision of the Carriers. Their population goes under the common name of *Natlo'tenne* (contracted from *Natleh-hwo'tenne* or people of Natleh.‖) About 135 persons form the population of their two villages Natleh and Stella,** one at each end of the lake.

The aggregate of the above enumerated septs constitutes what I generally designate under the collective name of Lower Carriers. Though slight linguistic peculiarities give to each of them a real individuality, yet the dialect of all contains very important characteristics common to the whole aggregate which differentiate it from that of any of the septs or subtribes which remain to review.

---

* "Half-ʇus," the name of a carp-like fish.

† "Wherewith one catches fat."

‡ "The Big-fattening."

§ "The Junction."

‖ "It (i.e., the salmon) comes back again."

** The Cape.

Under the name of Upper Carriers I include :—

6. The *Na-'kra-ztli-'tenne* or people of Na'kraztli* Stuart's Lake They inhabit two villages, Na'kraztli and Pintce† on the southern end, and on the middle of Stuart's Lake. They number 180 souls, and they are of all the Carriers those who have made the greatest strides towards civilization.

7. Immediately to the north-west, on the same lake and its tributaries, Lakes Tremblay, That'ɬah,‡ and Connolly, a second subdivision of the Upper Carriers, the seventh of the whole tribe, occupies four smal villages, two only of which are regularly organized with a chief and the usual native officers. These are Tha-tce,‖ and Sas-thût§ respectively at the confluence of Thatce river on Stuart's Lake and near Fort Connolly on the lake of that name. The others are 'Kəztce** formerly an important locality on Thatce river and Yə-Ku-tce†† at the north-western extremity of Stuart's Lake. The original home of all these bands was at the end of that lake, as is manifest from their common name as a sept: *T'ɬaz-'tenne*, people of the bottom or end of the lake. Their total population is not over 90.

Some nine or ten years ago, Drs. Tolmie and Dawson published conjointly a valuable ethnological map of this province,‡‡ which does not tally in every respect with my description of the northern limits of the Carriers' territory. The line of demarcation between the Carriers and the Tsé'kéhnes' hunting grounds passes, on that map, through the middle of Thatlah lake, giving the latter a large strip of land wkich I grant to the former. I must explain that the authors of that map thereby point to the *de jure* or original territory of the Carriers, while I sketch above the *de facto* or actual limits thereof. By right Bear's or Connolly lake and adjacent country belong to the Tsé'kéhne tribe ; but, as a matter of fact, the village which is situated close to the H. B. Co's. fort is now the

* For the etymology of this name, see "The Déné Languages," Trans. Can. Inst. 1889-90, p. 188.

† Confluence of the *Pin* river.

‡ "Bottom of the water," the equivalent of the French "Fond du Lac." The real native name of this lake is *Rél-rə-ɬən, lit*, "*burden-near-lake.*"

‖ "The tail," (i.e., confluence in the lake) of the water.

§ "Black Bear bathing place."

** Confluence of the *'Kəz* river.

†† The confluence of the river *Yəkuztli*, (the outlet of *Yako* lake).

‡‡ Appended to "Comparative Vocabularies of the Indian tribes of B. C. ; Montreal, 1884.

rendezvous of representatives of three different tribes, namely: the Tsé'kéhne who periodically congregate there for trading purposes and have no permanent residence; the Carriers, a band of whom now inhabit the village and hunt in the vicinity of the lake with the consent of the former; and the ʒtnas or Kitiksons from the Skeena river who are considered as mere intruders and as such live there only on sufferance.

Both the Na'kraztli'tenne and the T'ɬaz'tenne receive from the Babines the name of 'Kutəne.

The following subdivisions might be designated under the collective name of Babines, since in language they are practically one, and the custom of wearing labrets which gave its distinctive name to one of them was common to both. They are:—

8. The *Nitu'tinni* (in Upper Carrier *Nato'tenne*) or Babines who inhabit the northern half of Babine lake in three villages and number actually some 310 souls.

9 The *Hwotsu'tinni* (in Upper Carrier *H'wotso'tenne*) or people of the river Hwotsutsən.* They are called *Akwilgét*, "well dressed," by the Kiliktons, their immediate neighbours of Tsimpsian parentage, and after them by the whites. They inhabit two villages, Tsé-tcah,† KéyəR-hwotqət,‡ and two smaller places now organizing, Tseɬ-'kaz-Kwoh,§ and Moricetown on the HwotsotsənKwoh or Buckley river and what is known in the country as the telegraph trail. All of these localities are within the northernmost extremity of these Indians' hunting grounds which extend from Français Lake up to the Skeena River. Several members of that sept are allied by blood with their alien neighbours, the Kitiksons. They number about 300.

The language of these different branches of the Carrier tribe, while remaining essentially the same, undergoes however marked variations corresponding to its ethnographical subdivisions. Upon that ground I have even sometimes asked myself whether distinct individuality as a tribe should not be granted to the Babines whose linguistic or even psychological peculiarities are so glaring that they cannot escape detection even by the most careless observer. Much of their dialect would indeed be "greek" to an Ɂthauʔten visitor.

It is also but right to warn the reader that the three main divisions of the tribe into Lower Carriers, Upper Carriers and Babines, although

* Almost equivalent to "Spider."

† Down against the Rock.

‡ Old Village.

§ River of the axe edge.

founded on language and geographical distribution, are not recognized by the Carriers themselves, who know of no other than the above enumerated minor subdivisions.

The Tsi|Koh'tin and Carriers have a well organized society composed of the hereditary "noblemen" who own the land, and the common people who hunt with and for them. They formerly had no local head-chiefs. Moreover, irrespective of the ethnographic divisions based on language and habitat, they are divided into several gentes the members of which believe themselves bound by ties of the strictest relationship. They were originally exogamous, and throughout the entire Carrier tribe matriarchate or mother-right is the law governing succession to titles and property.

Among the *Tsé-'kéh-ne*, or "People-on-the-Rocks" a simpler and more primitive social organization obtains. That tribe, through necessity as much as from natural inclination, is entirely nomadic. As salmon is unknown throughout their territory, these aborigines have to be almost constantly on the move after the moose, cariboo and other large animals on whose flesh they mainly subsist. Father-right is their national fundamental law, and the whole tribe is composed of bands slightly differing in language, and with no regular chiefs. In fact, their society, such as it is, might almost be termed a perfect anarchy, were it not that the advice of the oldest or most influential of each band is generally followed as far at least as regards hunting, travelling and camping.

Though each band has traditional hunting grounds, the limits of these are but vaguely defined, which is not the case with those of the Carriers. Furthermore, several members of one band will not unfrequently be found hunting unmolested on the land of another. Therefore no very strict boundaries can be assigned to the following tribal subdivisions which comprise all the Tsé'kéhne population within the political borders of British Columbia :—

1. The *Yû-tsû-t'qenne*, or "people down over there" (*i. e.*, in the direction of an expanse of water) are the band which from time immemorial bartered out to the Carriers the axes and other primitive implements of which due mention shall be made further on. They are so called by the rest of the tribe by allusion to their commercial relations with the Carriers of Stuart's Lake. Their hunting grounds lie from Salmon River* to MacLeod's Lake and thence to the Fraser, by 53° 30'.

2. The *Tsé-'kéh-ne-az*, or "little-people-on-the-rocks" roam over the

* There are so many Salmon rivers in the north of British Columbia that it may be necessary to explain that the one here mentioned empties itself into the Fraser a little above Fort George.

land which extends between the latter lake and the summit of the Rocky Mountains. They are often to be found hunting on the western slope of that range.

3. The *To-ta-t'qenne* (" people-a-little-down-the-river ") inhabit the eastern slope and adjacent plains of the Rocky Mountains within British Columbia.

4. The *Tsa-t'qenne* (who call themselves *Tsa-huh*) or Beaver-people, roam over the large prairies contiguous to the Peace River, on the south side of that stream and east of the Rockies.

5. The *Tsé-'ta-ut'qenne* (the people against the Rocks) as hinted by their name, have their habitat chiefly at the base of the Rocky Mountains on the north side of the Peace River.

6. This is perhaps the proper place to mention the *Sarcees*,* who have been adopted by the Blackfeet Confederation, and actually live east of the Rocky Mountains by about 51° lat. north.

7. To the north of all the above sub-divisions, from the 56° to the north, we find the *Sas-chût-'qenne* or "people of the Black Bear" whose trading post was until last year Fort Connolly on the lake of that name.

8. Another band called *Otzən-ne* (people between or intermediary) claims the land which intervenes between the territory of the Saschut-'qenne and that of the Tsélohne on the west side of the Rocky Mountains.

9. Those *Tsé-loh-ne* (people of the end of the Rocks) live immediately north of the latter and their chief trading post is now B. L. O. (Bear-Lake-Outpost) on the Finlay River by 57° of latitude north. Their name is due to the fact that their habitat is an immense plain which is said to intersect the whole of the Rocky Mountains which are popularly believed not to extend any further.

The aggregate population of all these bands does not exceed 1,300.

The *Tsé'kèhne* are known to the Carriers under the name of *ʔ'tat-'tenne* or " people of the beaver-dams," while the latter are responsible for the distinctive name of the Carriers—*Areɣne*, " packers." The nickname *Ta*-K*eɣ-ne* by which this tribe sometimes calls itself † is of recent origin It has no meaning in its language to which it is exotic, and I cannot

* Their aboriginal name as a sept is unknown to me. A century ago they had 35 tents with a population of 120. (History of Manitoba, p. 85).

† Indeed they even call thus all the races of Indians by opposition to the whites.

imagine whence it originated. It is the would-be *Tacullies* or *Takullies* of the ethnographers.*

The foregoing information will be found recapitulated in the following list showing the tribal subdivisions from south to north of the Tsilkoh'tin, the Carriers and the Tsé'kéhne.

TSILKOH'TIN TRIBE.

Stone Tsiɂkoh'tin ; immediately south of Chilcotin River.
Tɂɛskoh'tin ; ten miles north of the mouth of Chilcotin River.
T'ɂotheñkoh'tin ; north bank of Chilcotin River, 45 miles from its mouth.
Independent septs ; Fort Alexander and Nakûntl'ûn.

CARRIER TRIBE.

Ɂthau'tenne ; Fort Alexander.
Nazku'tenne ; Quesnelle and mouth of Black Water River.
Nutca'tenne ; on Black Water and throughout its basin.
Ɂano'tenne ; Fort George.
Natlo'tenne ; Fraser Lake.
Na'kraztli'tenne ; Stuart's Lake.
T'ɂaz'tenne ; upper end of Stuart's Lake and tributaries.

BABINE SUBTRIBE.

Nétu'tinni ; Babine Lake.
Hwotsu'tinni ; Buckley River and Français Lake.

TSÉ'KÉHNE TRIBE.

Yûtsût'qenne ; from Salmon River to McLeod's Lake.
Tsé'kéhneaz ; from McLeod's Lakes to the Rocky Mountains.
Totat'qenne ; immediately east of Rocky Mountains.
Tsat'qenne (the Beavers); south side of Peace River.
Tsè'taut'qenne ; base of Rocky Mountains close by preceding.

---

* The number of different orthographical readings of the names of the north-western Déné tribes is truly wonderful. Thus the Carriers (*Takqne*, the "Porteurs" of the French Canadians) are called *Tahkali* and *Tahcully* by Anderson, *Teheili*, by Dawson and *Takully*, *Tacully*, *Takulli* by others. The Tsé'kéhne are *Thé-kka-nè* to Petitot, *Thekenneh* to Kennicott, and *Sicany*, *Siccani*, or *Sikani* to others. I am ashamed to own that I have myself countenanced in former papers the wrong reading "Sèkanais" of my predecessors here.

Sarcees; immediately east of Rocky Mountains, 51° lat. north.
Saschût'qenne; Connolly Lake and north. West side Rocky Mountains.
Otzənne; north of preceding, same side of mountains.
Tsèlohne; north of preceding, same side of mountains.

To the above I should add the *Nah'ane** whose hunting grounds lie to the north of those of the Tsé'kéhne. But I am not familiar enough with their tribal divisions to state them with any degree of certainty, nor do I sufficiently possess their technology to speak authoritatively of it. It may however be broadly stated that from an archæological standpoint the Western Nah'ane may be classed as Carriers, while the Eastern Nah'ane are to all practical purposes regular Tsé'kéhne.

* The so-called *Nehawni* of Pilling, the Na"ane of Petitot, the Nahâwney of Kennicott, the *Nehawney* of Ross and the *Nahawnies* of others.

CHAPTER II.

PRELIMINARIES—PHILOLOGICAL.

Even Philology is not without bearing on Archæology. More than once the former will prove a great help towards elucidating such problems as the relative age or history of the human products whose aggregate constitutes the *raison d' être* of the latter. Thus the necessaries of native life, those objects which are the most indispensable to savage man and whose appearance as technological items must therefore have been the earliest are, as a rule, expressed in Dené by monosyllabic roots as *thû*, water; K*wən*, fire; *ɟo*, fish; *tsa*, beaver; *'kra*, arrow; *ɟij*, snare; *kuh*, trap; etc. Other objects or implements of more complex nature or less general import, or the use of which supposes higher steps in the industrial ladder, are rendered by polysyllabic words. In the language of the Dénés, the more primitive an object, philologically also the simpler its name. Implements of complicated structure or of recent introduction among the aborigines have almost invariably names of similarly composite fabric.

These considerations have led me to give, either in the text or through foot-notes, the aboriginal name of each item of native technology mentioned in the present monograph. As we shall presently see, some of these names admit of no literal translation; but when such translation is possible, it shall accompany the Indian word. Unless otherwise noted, those names will be in the Carrier dialect.

That the reader may the more easily recognize the category to which such words etymologically belong, and thereby judge of the place the objects they represent occupy in the Dené technology, I deem it not irrelevant to reproduce here the following paragraphs from a former paper on the Dené languages.

"Considered in their material structure and etymology, the Dené nouns may be divided into four classes. These are the primary roots which are all monosyllabic as in Chinese. Such are *ya*, sky; *thû*, water; *tsé*, stone; *ɜ̄ɔs*, black bear; etc. Theyare essentially nominative: they neither define nor describe the object they designate; they merely differentiate it from another. I consider them as the remnants of the primitive Dené language, inasmuch as they are to be found with little or

no alteration in all the dialects of the family, whatever may be the distance intervening between the aborigines who speak them.*"

No etymology or other explanation than that of the text will be given of words belonging to this category, because they admit of none. Thus the context will indicate for instance that Rɔ̨ is a war club, that *we* is a kind of fish trap, etc., without any attempt being made at explaining the origin of either word, or at giving a more literal sense of them than that furnished by the translation, which would be impossible. They have no derivation, but on the contrary may serve as the compounding elements of other words of secondary import.

"The second category comprises roots of simple import which are genuine unsynthetical substantives though polysyllabic, generally dissyllabic, in form. To this category belong words as *tɔne*, man; *t'sèkhè*, woman; *pɔ̃ñrɔn*, lake; etc. They possess, to a limited extent, the properties of the monosyllabic roots, being likewise merely determinative and oftentimes varying but little with the change of dialect."†

Here it may be added that even in these nouns there is generally one syllable which is more important and contains, as it were, the quintessence of the word. Thus it is with the *ne* of *tɔne*; the *t'sè* of *t'sèkhè*, the *pɔn* of *pɔ̃ñrɔn*. In composite words, such syllables only are retained. So the Carriers will more commonly say *ne-ɔran* murderer, than *tɔne-ɔran*, while in such compounds as *ɲi-t'sè*, she-dog, and *pɔn-tco*, big lake, the weak or secondary syllable has also disappeared.

"The third class contains composite nouns formed, as a rule, by compounding, though sometimes by agglutinating, monosyllabic or dissyllabic roots. Such are *ne-na-pa-ra* (literally: man-eyes-edge-hair) eye lashes; *tɔpe-té*, wild sheep horns; *mai-ré*, vegetable oil instead of *mai-*Ré, literally, fruit-oil. These nouns being mere compounds of roots belonging to the two former categories have the same degree of relative immutableness with regard to the various dialects as the radicals which enter into their composition."‡

In like manner, implements designated by names of this category may be of as ancient origin as those denominated by words of the first.

Thus, *tsa-m-piɲ*, beaver snare, contains two ideas of simple import—the medial *m* being merely euphonical and demanded by the following *p*. That words of this class may not be confounded with terms of the preceding, their compounding roots will be separated by a hyphen.

* The Déné Languages, etc. Transact Can. Inst. vol. I, 1889-90, p. 181.

† *Ibid.*

‡ *Ibid*, p. 182.

"The fourth and last class is made up of verbal nouns which, as their name indicates, are nothing else than verbs in the impersonal or personal moods employed to qualify objects of secondary import with the help sometimes of a radical noun, sometimes of a pronoun, and always of a prepositive particle prefixed to, or incorporated in, the verbal substantive. Of this description are the words *pe-yən-əl'qəl* (lit. with-earth-one cleaves), plough; *u-'kwət-'səzta* (lit. it-on-one sits), seat; *ə'ten-pa-yə*R (lit. work-for-house) work-shop."*

Very few of the objects or implements designated by words of that class can be regarded as of really ancient origin.

As for the orthography followed in the present monograph for rendering aboriginal words, it is as follows :—

The vowels have the continental sounds. When accentuated, they undergo the same phonetic changes as French letters do when affected by similar accents. Thus *â*, *î*, *ô*, have the same sound as in French; *e* and *u* as in Italian; *é* is sounded as the *e* of "mets", *è* as that of the English "ten", while *ə* corresponds to the so-called French *e muet* in such words as *je, te, le.* *W* is always a consonant.

Subject to the following remarks, the consonants have also the continental sounds. *H* is strongly aspirated; *ñ* represents a nasal *n* followed by a common or sounding *n*; *ʃ* is a lingualo-sibilant which is obtained by the emission of a hissing sound on both sides of the tongue curved upwards previous to its striking the lingual letter; *r* is the result of uvular vibrations, and when immediately following a guttural (*g*, *k*, *kh*, 'k, or K) it is almost impreceptible to the ear; K, and R, are respectively *k* and *r* pronounced with a very guttural inflection; *q* nearly resembles *ty*, both letters being simultaneously sounded; *c* represents the English double consonant *sh.* The apostrophe (') prefixed to *k*, *t*, *q*, adds to the regular pronunciation of those letters the exploding sound peculiar to most Indian languages. *s̄* is intermediate between *s* and *c.*

Th, *kh*, are equivalent to t+h and k+h and are produced by a single emission of voice. T's and t'ʃ are "exploded" and their exact value cannot be realized otherwise than by hearing them pronounced by a competent person.

The hiatus is represented by a period in the upper part of the line (·).

* *Ibid., ibid.*

WORKS AND IMPLEMENTS UNKNOWN AMONG THE WESTERN DÉNÉS.

Before attempting to detail what our aborigines have or had of archæological ware, it may not be amiss to enumerate what they do not have and apparently never had.

Throughout the whole extent of their territory, no mounds, enclosures, fortifications of a permanent character or any earthen works suggesting human agency are to be found, nor is their existence, past or present, even as much as suspected by any Carrier, Tsé'kéhne or Tsiɬkoh'tin. In the same manner, pottery, clay implements, perforated stones, mortars, ceremonial gorgets, gouges, stone sledges and articles of shell either plain, carved or engraved, have to this day remained unknown among them. They did formerly, and do still occasionally, use stone pestles. But for the mortars common among natives of most heterogeneous stocks, they substitute a dressed skin spread on the ground whereon they pound dried salmon, salmon vertebræ, bones, etc.

Such sweeping assertions may astonish those readers who have already been informed by Dr. D. G. Brinton that among the Dénés "utensils were of wood, horn or stone, though the Takully women manufactured a coarse pottery and also spun and wove yarn from the hair of the mountain goat."* This statement is quite a surprise to me, inasmuch as I supposed it was a fact well known to Americanists that no pottery of any description existed among such north-western stocks of aborigines as the Déné, the Tsimpsian, the Haida, the Kwakwintl, the Tlinget and the Eskimo. As for the spinning of the hair of the mountain goat Dr. Brinton probably confounds the Carriers (his Takully) with the Pacific Coast tribes which did and occasionally do make good blankets out of that material.†

I have also mentioned the mortars among articles unknown to the original Dénés. Therefore I must call attention to a statement of A. Niblack in his valuable monograph on "The Coast Indians of Southern Alaska" wherein he says: "These [mortars] were by some people supposed to indicate that in early days these Indians ground maize *as did and do the hunting Indians of the interior.*"‡ The italics are mine.

* The American Race, p. 71.

† A gentleman speaking *de visu* states that "yarn is spun from the wool of the mountain goat (not the mountain sheep or big-horn) and is woven into excellent blankets which are highly coloured and ornamented." (Notes by Mr. J. C. Callbreath in G. M. Dawson's "Notes on the Indian tribes of the Yukon District" etc., reprint, p. 6). But this statement applies to the Thaɬthan division of the Nah'ane, not the Carrier tribe.

‡ The Coast Indians, etc., in Ann. Rep. of the U. S. National Museum, p. 281; 1890.

These words, coming from an author who is generally so well informed, are at best perplexing. To whom does he allude in this reference to the maize growing huntsmen of the interior? Most people will answer that it must be to the Déné Indians who, in the latitude within which the subjects of his sketch are stationed, people the American Continent practically in its whole breadth. Of course, he cannot thereby refer to the Iroquois and the Hurons whose habitat is close to the Atlantic, not the Pacific coast. Now it is so well known that the Dénés were but recently innocent of the least attempt at cultivation that I cannot regard this extraordinary assertion as anything else than a slip of the pen.

A natural apathy, lack of artistic ambition or want of skill caused the Western Dénés to be practical, rather than æsthetic craftsmen. Where extra exertion was not absolutely necessary, it was very seldom bestowed upon any kind of work. Therefore most of the implements which we shall examine in the following chapters are exceedingly simple and sometimes even rude in appearance. For instance, the Déné, knowing by experience that a stone lashed, while in its natural state, to his fishing-net was doing as good service as the most elaborate sinker, never attempted to fashion it into any of the artistic shapes given similar implements by many other families of Aborigines. For this reason carved or even merely grooved sinkers are also to be classed among the industrial implements unknown to the Western Dénés.

A fact which will perhaps elicit incredulous comment is that not only our Aborigines' earliest acquaintance with tobacco, native or Nicotian, dates only from 1792 for the Tsé'kéhne and 1793 for the Carriers, but even the very act of smoking was unknown to them prior to those dates. As a consequence, pipes of any material or form are an adventitious

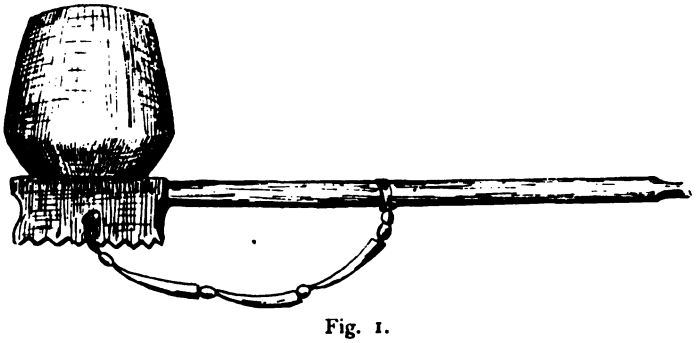


Fig. 1.

item amongst them. Fig. 1 represents the earliest known model of pipes of Déné manufacture. It consists of a stone bowl with a serrated base wherein a wooden stem has been inserted. Bowl and stem are connected

by means of a chain of dentalium shells alternating with coloured glass beads. A pipe strikingly similar in form, but *minus* the string of shells and beads, was also in use among the Shushwap Indians, the southern neighbours of the Western Dénés, as appears from a sketch in Dawson's "Notes on the Shushwap People of British Columbia." *

Against the above assertion as to the absence of smoking pipes among the primitive Dénés, it might be contended that the Tsiɬkoh'tin, who were more venturesome than the two other tribes, must have known through the Coast and Shushwap Indians, the species of wild tobacco which is said to have been cultivated by the natives of Queen Charlotte Islands, or gathered in its wild state by the Shushwap.† But to any person who is aware of the irresistible attraction all races of Aborigines feel towards the use of the soothing weed, whether genuine or counterfeit this hypothesis will appear altogether gratuitous. Albeit the tribal intercourse between the Tsiɬkoh'tin and the Carriers was formerly a rather rare occurrence and not always of the most friendly description, had smoking been in vogue among the former, the latter could not well have failed to notice in their neighbours a practice which is claimed to have appeared so strange to them at the time of their first meeting with the whites. Now both the Tsé'kéhne and the Carriers are positive that it was unknown to their ancestors previous to their encounter with *Mə-tsi-ra-nəɬɲoñ* ‡ or Sir Alex. McKenzie; and they still recount, with no lack of amusing details, first their stupefaction at beholding smoke issuing from men's mouths, and then their scorn for tobacco when they ascertained that it was not edible. §

---

* Transact, R. S. C. p. 12, fig. 3; 1891.

† *Vide*: "On the Haida Indians of Queen Charlotte Islands," by G. M. Dawson, p. 114 b, 115 b, Montreal, 1880; "Notes on the Shushwap People of B.C.," by G. M. Dawson, Trans. R.S.C. Sect. II., p. 23, 1891; "Descriptive Notes on Certain Implements," etc., by Al. Mackenzie, Trans. R.S.C., Sect. II., p. 55, 1891; "The Coast Indians of Southern Alaska," etc., by A. P. Niblack, p. 333, 1890.

‡ In Tsé'kéhne: "his hair is plentiful," perhaps by allusion to the wig or queue worn by Sir Alex. Mackenzie.

§ The derivation of the word *ətc'ka*, by which the Carriers designate tobacco, has long puzzled me. It must be either a borrowed word or a word formed by agglutination, as the name of the horse (*yezih-ɣi*, "elk-dog" or domestic elk). Now I have studied that word in the vocabulary of over twenty tribes, all contiguous, mediately or immediately, without being able to discover anything like an homonymous equivalent. On the other hand, the two parts of which it is composed, *ətc* and *'ka*, are genuine Carrier particles which, taken separately, are not without meaning, but to which no rational signification can be ascribed when joined together. Yet the names of all new objects in the Déné languages are either borrowed from foreign dialects, or more generally formed by compounding, that is by the juxtaposition of two or more names of objects already known. Thus, in Tsiɬkoh'tin the name of the tobacco is *tsɲ-yu*, which means "smoke-medicine." Altogether, the Carrier (and Tsé'kéhne) word designating that imported plant has the appearance of an old root of the second category, which is to me inexplicable.

Pipe Fig. 2 is of recent manufacture, and bears testimony to the Tsi|Koh'tin's faculty of imitation. It has been wrought out of an impure steatite or soap stone. Its stem is a wooden tube connected with the base of the bowl by a double string or chain of black beads. The stem of such pipes is more generally lengthened through the insertion of a perforated brass cartridge shell between the base and the mouthpiece.

Fig. 2.

Specimens of pipes identical in form, and sometimes in material, though many are of serpentine, are also found among the Tsé'kéhne. But now-a-days the poorest Carrier scorns them as utterly unsuited to his present state of civilization.

CHAPTER III.

STONE IMPLEMENTS.

Some scientists seem to have an innate fondness for the mysterious and the insolvable. Upon the slightest pretext they delight in creating difficulties or propounding problems. They long for novelties and must soar above the concepts of such weak-minded mortals as are naive enough to pay any attention to the "Hebrew myths" of the creation of man and his comparatively recent appearance on the scene of this world. Whereas in modern times we have no authentically recorded instance of mound building by American Aborigines,* and because some of those artificial works are of considerable magnitude, they jump to the conclusion that the so-called mound-builders must have been a very ancient race, more advanced in civilization than the Indians of our days and altogether different from them.† In like manner, because in Europe, and in some parts of America stone implements have been discovered which are of a particularly rude pattern, they infer that these remains being found in river beds or, in Europe, imbedded in geological strata supposed to have been formed at a very remote epoch prove the existence, not only of prehistoric, but even of pre-Adamite man. Students who prefer to rely on the authority of such an unerring guide as the Bible to following modern savants through their ever shifting, if not conflicting, theories, cannot but remark, I fancy, that, in the same way as the latest researches tend to confirm the opinion of those unprejudiced antiquarians who from the beginning doubted the great antiquity of the American mounds and the extraneous nationality of their builders,‡ even so it must ultimately

* As will appear from note ‡ the Cherokees did erect mounds, though unobserved by the whites, within the present century.

† "So strong in fact is the hold which this theory . . . has taken of the minds of both American and European archæologists, that it not only biases their conclusions but also moulds and modifies their nomenclature, and is thrust into their speculations and even into their descriptions as though no longer a simple theory, but a conceded fact." *Burial Mounds of the Northern Section of the U. S. by Prof. Cyrus Thomas; Fifth Ann. Rep. Bur. Ethnol.* p. 80.

‡ Evidence corroborative of this assumption would fill many pages. Scientists in every way qualified to speak on this subject and to whom nobody can refuse a hearing have clearly shown the futility of the theory which ascribes the erection of the mounds to non-Indian races. Prof. Cyrus Thomas, than whom I think there is no more reliable authority on the subject, lays down as one of the conclusions derived from the mound explorations under the auspices of the Smithsonian Institution that "nothing trustworthy has been discovered to justify the theory that the mound builders belonged to a highly civilized race, or that they were a people who had attained a

prove to be the case with regard to the fabulous age ascribed to what are called palæolithic implements. By the end of the last century Voltaire and his school were wont to adduce the pretended enormous antiquity of the Egyptian monuments as an irrefutable evidence of the inaccuracy of the Mosaical chronology. Time went on, and the days came when Champollion and Sir. H. Rawlinson deciphered the Egyptian and Assyrian inscriptions. Then the very same works which fifty years before were instanced as an excuse for the encyclopedists' sneers at the Scriptures were converted into the best extrinsical proof of the accuracy of the Mosaical account.

I am not an archæologist, much less a geologist. Yet, upon entering into a question in connection wherewith so many strange and, to me, evidently

---

higher culture status than the Indians. It is true that works and papers on American Archæology are full of statements to the contrary which are generally based on the theory that the mound-builders belonged to a race of much higher culture than the Indians. Yet, when the facts on which this opinion is based are examined with sober scientific care, the splendid fabric which has been built upon them by that great workman, imagination, fades from sight. . . The links discovered directly connecting the Indians and the mound-builders are so numerous and so well established that there should be no longer any hesitancy in accepting the theory that the two are one and the same people. . . The testimony of the mounds is very decidedly against the theory that the mound-builders were Mayas or Mexicans" *Work in Mound Exploration of the Bur. Ethnol., Washington, 1887, p. 11-13.* To corroborate by actual facts my position on this question, I glean from the same paper the following extracts:—"In another *Wisconsin* mound . . . was found lying at the bottom on the original surface of the ground, near the center, a genuine, regularly-formed gunflint. In another *Tennessee* mound some 6 feet high and which showed no signs of disturbance, an old fashioned horn handled case-knife was discovered near the bottom. . . From a group in Northern *Mississippi* in the locality formerly occupied by the Chickasaw were obtained a silver plate with the Spanish coat of arms stamped upon it, and the iron portions of a saddle. At the bottom of a *North Carolina* mound, part of an iron blade and an iron awl were discovered in the hands of the principal personage buried therein. . . At the bottom of an undisturbed *Pennsylvania* mound, accompanying the original interment . . . was a joint of a large cane wrapped in pieces of thin and evenly wrought silver foil, smoothly cut in fancy figures." *Ibid. p. 9 and 10.* I have underlined the names of the states mentioned to show that mound-building in post-Columbian times was by no means local or exceptional. To the above should be added the still more significant fact that in a small undisturbed mound in east Tennessee a stone with letters of the Cherokee alphabet rudely carved upon it was lately discovered by a party of American explorators. *The problem of the Ohio Mounds*, p. 37, note 1. Dr. D. G. Brinton in his latest work, *The American Race*, p. 87-88, admits that "there is, to say the least, a strong probability that they [the modern Muskokis] are the descendants of the constructors of those ancient works" [namely, the mounds in their vicinity]. Over and above the authorities already quoted, here is how Dr. J. W. Powell, the learned head of the Bureau of Ethnology, Smithsonian Institution, ends a review of an important paper by Mr. W. H. Holmes:—"This eliminates one more source of error cherished by lovers of the mysterious to establish and exalt a supposed race of Mound-Builders." *Third Ann. Rep. Bureau of Ethnology*, p. lxiii.; Washington, 1884. Nobody will deny that that gentleman, owing to his official position, enjoys opportunities of judging of the merits or demerits of a cause of which few indeed can boast. Lastly, it must be added that unlimited evidence goes to prove that in almost every case the modern Indians occupy the exact territory where their forefathers lived when they first came in contact with the whites.

false theories have been built, I feel the necessity as a Christian and an observer of my own surroundings to put on record my utter disbelief in any proposition which may run counter to the natural deductions from the Book of Genesis. True, even Christian anthropologists are far from agreed as to the probable age of man, since such a learned orientalist as the Abbè Vigouroux suggests * and Father Thein inclines to believe † that creation dates from over 8000 years as against the 6000 which it was customary to reckon as the maximum distance which separates us from Adam. Yet methinks that there are limits beyond which modern interpretation of the sacred text cannot safely go. I suppose that no person who has any regard for the authority of the Bible—I am tempted to add, and for sober, common sense ‡—will believe in the hundreds of thousands of years attributed by some to palæolithic stone implements and consequently to man. To show that there are valid reasons to doubt the correctness of such chronological computations, let me adduce here a few facts derived from the very source to which they are wont to point in confirmation of their extravagant theories, I mean Geology.

The great antiquity attributed in Europe to stone implements is based generally on the age of the geological strata wherein they are found. For the sake of briefness, let us choose those the formation of which is the most easily accounted for, say the alluvial strata. Pieces of pottery found at a depth of thirty-nine feet in the mud of the Nile delta were pronounced by antiquarians of repute to be 13,000 years old. Such authorities as Sir John Lubbock and Sir Charles Lyell asserted in various papers that those Egyptian relics must date back from 12,000 to 60,000 years. Now, Sir R. Stephenson found at a *greater* depth in the delta, near Damietta, a brick bearing on its surface the stamp of Mohammed Ali ! § The discoverer of the pieces of pottery " rated the growth of the mud deposit in a given spot at only three and a half inches in a century ;

* *Les Livres Saints*, etc., Vol. III., p. 238.

† Christian Anthropology, p. 245, New York, 1892.

‡ For my own justification and to illustrate the vagaries of some modern scientists, let me recall the fact that from the supposed vestiges of man discovered in the strata of the tertiary period, some geologists assign a date of at least 300,000 years before the beginning of the historic epoch. Now a clever Italian writer who has made an arithmetical computation of the number of men who must have been existing on the earth at the time commonly assigned to the creation of Adam according to that hypothesis, finds that this number cannot be expressed without 434 figures ! Suppose the habitable part of the earth extended in a series of stories each one meter in height and filled with men in the ratio of 10 to each square meter as far up as 400 times the radius of the moon's orbit and the limits of the earth's orbit will be reached and yet the number of these men will be represented only by the figure 2 followed by 26 ciphers.

§ Christian Anthropology, p. 267, New York, 1892.

but a description of the same spot by a Mohammedan writer only six centuries ago shows that the mud is deposited at the rate of over eighteen inches in a hundred years."*

An English resident in India recounts that the foundation of a house he had himself built was carried away and strewed along the bottom of a river at a depth of thirty or forty feet below the level of the country. "Since then the river has passed on," he says, "and a new village now stands on the spot where my bungalow stood, but forty feet above the ruins; and any one who chooses to dig on the spot may find my *reliquiæ* there, and form what theory he likes as to their antiquity or my age."†

Again, antiquarians of a geological turn of mind should remember, it seems, that in most cases the agents which now produce alluvial deposits were formerly many times more powerful and that therefore strata containing archæological relics were formed at a proportionately greater rate. Take, for instance, the valley of the Somme in France. No region has probably become so famous in the Annals of Archæology. The Somme is to-day a modest river with very quiet waters. Now, according to M. de Mercey, who has made a careful study of its history, its waters at the Roman epoch were fifty times more abundant than in our days.‡ Moreover, it is a well established fact that the sea at that time must have extended to Amiens, since below a marine deposit nine feet thick coins have been found, the most recent of which bears the effigy of a prince who died A.D. 267.§ In the neighbourhood of Lille, a medal of Marcus Aurelius was found at a depth of twenty-five feet under a triple bed of reddish clay, muddy slime and peat mixed with sand.‖

Thus Geology refutes itself the theories of the partizans of the great age of the primitive stone implements, theories which they claim to base on geological grounds. Let us now see what History has to say on the same subject.

The contention of the majority of antiquarians is that the stone age long antedated the historic period. In opposition to this, O. Fraas states that "arrows with sharp flint heads, and especially stone axes, stone chisels and stone hammers are found among the Germans, even down to the time of the Franks. . . . According to Herodotus, Ethiopians

* Southall, Recent Origin of Man, p. 474.

† Quarterly Journal of the Geological Society, p. 327, Aug. 1863.

‡ *Bulletin de la Société Géologique*, 1876-77, p. 347.

§ Christian Anthropology, p. 260, New York, 1892.

‖ *Matériaux pour l'histoire de l'homme*, p. 136, 1878.

accompanied the army of Xerxes, who were so savage that they possessed only weapons of stone and bone . . . ; they had long bows made of the ribs of palm leaves and reed arrows with pebble points; their javelins were pointed with the horns of gazelles."* Five hundred years later, Tacitus says of the Fenni: "They have no (iron) weapons. Their only means of attack are arrows to which, having no iron, they give a bone point."† Cæsar tells us in his *De Bello Gallico* ‡ that the Gauls, while besieging Alesia (52 B.C.), made use of stones and pebbles. An epic poem of the fifth century describes two warriors battling with stone axes.§ St. Ouen, bishop of Rouen in the seventh century, speaks of flint hatchets in his "Life of St. Eligius." As far down as 1066, projectiles of stone were in use in Europe according to William of Poitiers. It even appears that more than a century later the Scots of Wallace made use of stone arms. ||

History records many other similiar examples. I am well aware that the advocates of the great antiquity of man and human implements base their views on divers other reasons. But I think that all of these can be as easily disposed of.

INDUSTRIAL IMPLEMENTS.

The facts above recited are necessary to establish the really modern origin of many stone implements which some regard as absurdly ancient, and therefore if, in the course of the present monograph and more particularly of this Chapter, Déné implements or weapons are occasionally assimilated to objects, even palæolithic, of the same description found in the alluvial strata of Europe, my comparisons, instead of appearing preposterous, should be construed as additional evidence of the relatively recent origin of the European "finds." For, I cannot help thinking that some spear heads, for instance, which were in use here but one hundred years ago are identical in form and finish with weapons of the Solutrian period of the unpolished stone age. As for the industrial implements, and especially the axes of the prehistoric Dénés, though they might not perhaps be classed with strict propriety among palæolithic implements, I think they could not properly be styled neolithic, since they were mostly unpolished, except at the cutting edge.

---

* *Die alten Höhlenbewohner*, p. 30.

† *Apud* Christian Anthropology, p. 320.

‡ Book VII., 81.

§ *Ampere, Histoire littéraire.*

|| Christian Anthropology, *passim.*

Thus in fig. 3 we have a celt of a dark coloured, very close-grained rock which shows absolutely no sign of polish except at the cutting edge and, if I am to credit the Indian from whom it was obtained and who used it for some time as a skin scraper, even this faintly polished edge was wanting when the instrument was found on the surface of the ground. It would seem that these rude, unpolished axes were, at least among the Carriers, much more common than those entirely or even partially polished.

Fig. 3. ½ size.

Fig. 4. ½ size.

Fig. 4 hardly exhibits any trace of improvement on that primitive pattern. Indeed the specimen it represents has even cost the maker a smaller amount of exertion, since one of its flat surfaces is merely the original surface of a blackish siliceous stone in its natural water-worn state, while the reverse is evidently the result of the splitting of the pebble out of which the implement has been made. Were it not for the unmistakable attempt at obtaining by friction a finer edge than is usual in scrapers, one would almost suppose that it has been designed for dressing skins rather than cutting wood.

The specimen illustrated by fig. 5, though unpolished except at its broadest end, is more axe-like in shape. It is of a shaly rock externally rusty-looking, but internally of a reddish gray transversely striated with fine parallel lines.

The implement represented by fig. 6 again differs both in form and material from all the preceding specimens of stone axes. It might be described as gouge-shaped, were itnot that no concavity corresponds to the convex exterior. No attempt at diminishing by friction the bulging surface of the stone has been made; its main asperities only have been

polished off. It is of a gray basaltic rock, regularly wood-veined and very hard.

Fig. 5. ⅓ size.

Fig. 6. ½ size.

Here (fig. 7) we witness a sort of transition between what might perhaps be called the medio-palæolithic and the neolithic types, in that this adze-blade has been treated to a partial polish elsewhere than at its edge.

Fig. 7. ⅓ size.

Fig. 8. ⅓ size.

It is of a fine-grained volcanic rock which has been rendered rather hard by pressure subsequent to its original cooling. It is disproportionately thick and fully 8½ inches long.

All these differences in type and material are suggestive of what appears to be a well established fact, namely that the Western Dénés had no fixed standard in view when engaged in the manufacture of their adze-blades. Any stone of sufficient hardness and consistency was probably picked up, and after a rough blocking off, was given as sharp an edge as the material was susceptible of acquiring by means of the least possible exertion. No attention whatever seems to have been paid to the details and no regard manifested for the elegance of the implement.

This remark applies to adze-blades of genuine Déné origin. But the Carriers, especially the more prominent members of the tribe, possessed much finer axes of which fig. 8 is a fair example. This is a thoroughly polished stone axe. In shape and material it is typical of all the polished implements of that class. They are, as a rule, of a greenish gray rock identified by Dr. G. M. Dawson as fine felspathic slate or falsite. Although they were extensively used among the Western Dénés, it would hardly be consistent with truth to credit the latter with their manufacture. Indeed I am rather inclined to believe—and this is borne out by the declarations of living aborigines—that, in so far at least as the Carrier tribe is concerned, most of them were imported from among the neighbouring tribes. The Carriers of the old stock were exceedingly poor workmen, and their old men are unanimous in asserting that their best axes were bartered from the Tsé'kéhne and the sea-coast Indians. It is therefore quite possible that the implement above figured had an extraneous origin.

Fig. 9.

All these various types of axes were hafted to a handle generally of

black thorn,* *Prunus spinosa*, as is shown through fig. 9. The adzes thus obtained never had a cutting edge fine or hard enough to serve crosswise against wood, and the axeman's strokes had always to be directed obliquely.†

It must be noted also that, among the Carriers, such instruments were possessed by the notables and a few wealthy heads of families only. The common people had recourse to fire to cut their provision of wood. After having freed the main roots of a tree of the earth adhering thereto by means of slight excavations underneath, they would light there a small fire with vegetable matter with the result that the tree would inevitably topple over at the latest on the morrow thereafter. Then the smaller limbs were trimmed off either with a hard stick, with a stone club if any was at hand, or, among the Babines, with a bone or horn implement specially fashioned for the purpose. Smaller trees were next crossed over the trunk at the proper intervals to give the desired length to the pieces of wood, after which a fire was started at each point of intersection and maintained by the children or the women until both the larger and the smaller trunks were burnt asunder.

If too bulky to easily burn in the fire-place, the wood was then split with the help of wedges and a roughly formed wooden maul. Except among the Tsi[Koh'tin, the stone hammers and sledges so common among the coast Indians were unknown. For peculiarly heavy work such as sinking down the stakes on the solidity of which depends the firmness of the salmon weirs, they sometimes did, and even now do, use such elongated stones as bear the greatest resemblance to their *kwot'sɑz* or wooden maul; but these are never pecked or fashioned into regular sledges.

Fig. 10.

The Carriers' wedges‡ were either of hard wood, of the part of the

* In Carrier *kwɔs-tco*, "big thorn."

† The axe is called *tsej* in Tsi[Koh'tin, *tsɛ́j* in Tsé'kčhne and *tsij* in Babine; whilst, curiously enough, the Carriers now call it, and seem to have done so as long as any old man can remember, *tsé-tsij*, or stone-axe. Nevertheless, the Déné name of this primitive implement is evidently *tsej* or *tsij*, a primary root.

‡ *Yij*, pr. root.

cariboo horns next to the skull of the animal, or, in some cases, of stone (Fig. 10).

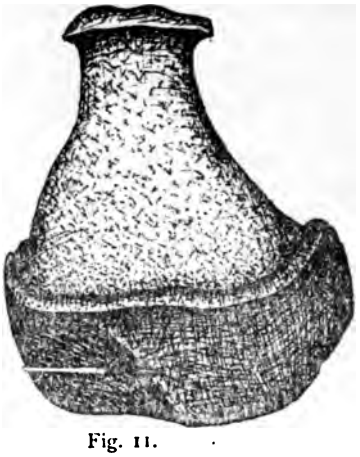


Fig. 11.

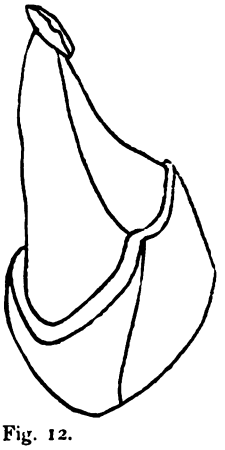


Fig. 12.

The implement illustrated above (Fig. 11) is a pestle* of a coarse variety of quartzite, of which Fig. 12 gives a side view. The lower half of the instrument has been left undisturbed by the artist, the handle only being pecked and smoothened to a fine enough finish. This pestle did service among the Babine Indians.

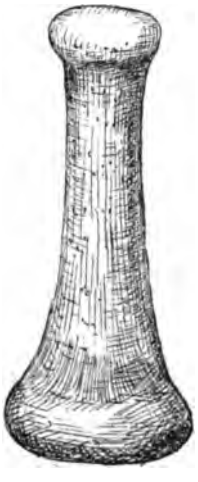


Fig. 13. ⅓ size.

Fig. 14. ½ size.

Fig. 15. ½ size.

A very different model is shown in Fig. 13, wherein we have an implement of TsiɁKoh'tin origin. It served a double purpose, being at

* *Pe-ɔtsɔl*, "wherewith one pounds," v. n.

the same time a pestle and a hammer.* But the mode of using it was identical in both cases; the contact between the matter pounded or hammered was only at the bottom of the larger end, the hand grasping the instrument in the middle. I have witnessed old men working with such stone hammers among the Skwahomish† with whom the Tsi|Koh'tin have occasional intercourse.

All races of American Aborigines are proverbially improvident, and our Western Dénés cannot be said to form an exception to the rule. Yet these very implements, when used as pounders or pestles, testify to the fact that the Carriers at least had at times a thought for the morrow. In times of plenty, they pounded therewith dried salmon previously well grilled by the fireside, and kept the mash in a *tcaɟyaɟ*, one of their bark vessels which shall be described further on. When this had been sprinkled over with salmon oil, the vessel was hermetically closed and the whole laid aside for use when, owing to the failure of the fishing season or any other cause, the natives were hard pressed by famine. Under similarly strained circumstances, salmon bones, or indeed the bones of any animal, were, and are, also likewise treated, and made to obviate similar needs.

a

Fig. 16.

Here (figs. 14 and 15) are slickstones or stone scrapers,‡ which serve in the process of tanning hides. As may be seen, they are of a very primitive pat-

* *Pe-sil'ɣɛ*, "wherewith one pounds or hammers," a verbal noun.

† The Sk'qō'mic of Dr. Boas.

‡ *Pe-eltzdh* "wherewith one scrapes" in Carrier; *tsé-tqél*, "stone-broad" in Tsé'kéhne.

tern, and neither of the two evidences any regard for elegance. And yet they are fair representatives of their class, even of those which are still in use among the modern Carriers. They generally consist of flat halves of oblong pebbles one end of which has been slightly trimmed by chipping with a hard stone. The object of such implements being to soften by repeated pressure the hide which has already been stripped of its hair and adherent blood and fat, these scrapers receive no polish whatever. This is why I rather hesitate in classing among the skin scrapers the instrument represented by fig. 16, which is a "find," and was not, like those above figured, in actual use among the natives when handed to me. It is of a very fine grained black volcanic rock polished at the broadest end *a*, and as it is drawn natural size, it is, if any, the smallest skin scraper I have ever seen.

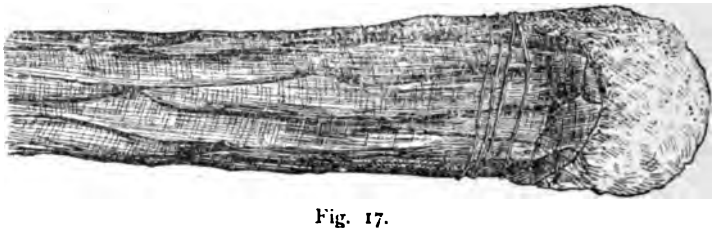


Fig. 17.

Most of these tools have received very little artificial treatment in their manufacture. In fact, they are almost invariably made as follows: any flat pebble which is likely to split as desired and thus yield easily suit-

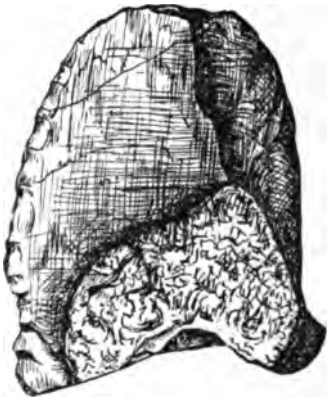


Fig. 18.

able material for the intended scraper is secured up between two stones on the ground and then split asunder by vigorously throwing a large stone on its upper end. The half which best answers the purpose in

view is then trimmed to the proper shape by chipping off any too prominent asperities, or blunting the edges, should these prove too sharp.

The scraper is finally hafted, as shown herewith, by inserting it in the cleft end of any stick at hand over which a rope or buck line is securely lashed. This hafting is but temporary, as the stone part only of the implement is usually kept among the family chattels.

To the unthinking reader unmindful of the straits to which man may be reduced in the absence of the proper material and while too hard pressed by more urgent needs to look for it, the above (Fig. 18) might not be more than a useless piece of quartzite. But an experienced archæologist will not fail to detect therein unmistakable signs of human handiwork, and its fine, if somewhat serrated edge will at once suggest that it did formerly duty as a cutting tool. It is a salmon knife, which served first to rip the fish open, and then to cut longitudinal furrows through its flesh previous to exposing it to the action of the air. The large flaking noticeable near its blunt end is not accidental, but served as a grip for the thumb, while the index and medius fingers rested respectively on the back or thick side and on the reverse surface of the implement.

Fig. 19.

Fig. 20.

Figs. 19 and 20 represent stone knives* of different pattern and use. They are skinning knives and their material is augite-porphyrite.

* The Carrier word for "knife" is the same as that for "iron," viz., *ɔzthih* in Upper Carrier and *ɔthé* in Lower Carrier.

Both are drawn natural size and their cutting edge is at the fore-end. Knive fig. 19 was used without handle, but fig. 20 was hafted to a short stick as is manifest from the side notches discernible therein. The identity of these instruments is beyond the possibility of a doubt, as it has been established by the testimony of an old Indian who used himself similar knives in his youth when no better ones were obtainable.

The most serviceable and therefore most highly priced working or carving knives in use among the prehistoric Dénés were nothing more or less than beaver teeth sharpened when necessary, by friction on a hard stone. But owing to the perishable nature of the material, none is now available for illustration. The only stone carving knife which has ever fallen under my observation is that herewith figured (fig. 21). I believe it to be of genuine black flint. The cutting edge is at *a* and it is still very keen. Notches at *b* and *c*, though slight enough, appear nevertheless to be quite intentional, and were it not for the symmetrical rounding off of the broadest end, they would suggest a double handle as the original means of facilitating work therewith. The Indians neither account for these notches, nor satisfactorily explain the mode of handling the knife.

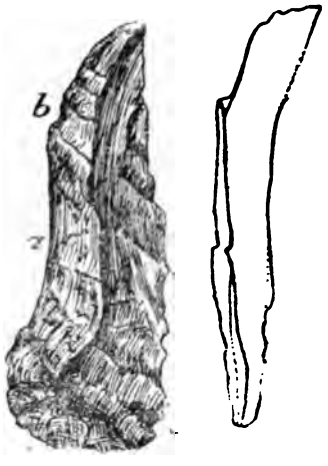


Fig. 21. ½ size.

Fig. 22. ½ size.

Fig. 22, represents a picece of broken object the original use of which is likewise problematic. It is of a variety of green marble variegated with yellow and rusty red. The broadest end has been thinned to a dull edge and, except where it shows signs of accidental breakage, it has received an exceedingly fine polish. Indeed, though it has been found here, at Stuart's Lake, I believe it far too skillfully finished to be of Déné manufacture. It must have been imported from the Coast. But

what renders this relic particularly remarkable is the presence of the very fine grooves noticeable on each of its three unthinned edges, two only of which appear in the cut above, the third being on the reverse of the implement. This peculiarity, while rendering the identification of the find more difficult, suggests a similarity of form though certainly not of use, with an implement formerly common among the Carriers under the name of *əzih*, "it grinds through." It consisted of two stone tablets carefully polished at least on one side so as to permit of their being closely joined together. In the middle of their polished surfaces was a groove obtained probably by pecking, not friction, which when both tablets were superposed formed a cylindrical hole through which gambling sticks, arrow shafts, etc., were repeatedly passed and thereby given an exquisite finish. None of these implements is now extant. They were the equivalent of the wooden wrenches used by the Hupas under similar circumstances.

Weapons of War and of the Chase.

Prominent among these were, of course the arrow,* and its correlative the bow.†

The arrow heads‡ of the Western Dénés were either of stone, of bone or horn, or of wood. The form, no less than the material, of the stone arrow points greatly differed. In fig. 23 will be found specimens representative of the most common patterns. Many of them are quite diminutive in proportions, and would seem to partake more of the nature of play-things than of that of the deadly weapons they undoubtedly were. As regards shape, those marked *a* and *b* may be described as the typical arrow-points of the Western Dénés. In common with specimen *c*, whose main peculiarity is the absence of one of the usual side notches, they are of a blackish resonant rock which I long mistook for a variety of flint, but which Dr. G. M. Dawson declares to be a very fine grained augite-porphyrite. The Carriers call this stone *pîs*, and it is one of the 16 varieties of rocks known to their vocabulary. They used it in the making of the largest number of their missile weapons, arrows, spears, etc. It is but right to remark here that the point *a* is so much larger than most genuine Déné arrow heads, that some Indians claim it was a bow, not an arrow point. Of the bow points further mention will soon be made.

---

* *'Kʏa*, prim. root.

† *ʒ̓ithi*. Singularly enough the Carriers have a collective name for bow and arrow taken together. This is *'Kʏa-zza*.

‡ *Nûntai*, second. root.

A less common and more valued material, called *nəlre* in Carrier, is the obsidian of which the arrow-point marked *d* is formed. Such points are generally very small. *e* represents the most beautiful of all the arrow heads in my possession. It has been ingeniously chipped of a hard crystalline rock identified by Dr. Dawson as smoky quartz. Its form and

Fig. 23.

finish display evidences of exceptionally good workmanship, too good in fact to be Déné; and I cannot help supposing that it must be some relic left among the Carriers by some coast warrior after one of those many conflicts recorded in the traditions of the old men. Other points, such as those labelled *f*, *h*, are of a species of translucent vitreous rock which probably does not essentially differ from that of specimen *e*.

That marked *h* is remarkable for the absence of both notches. It is long, narrow, and so thick that but for its intentionally thinned edges it might be taken for a drill point. A few arrow heads as that marked *g* are of chalcedony, *tsé-lkrai* (stone-whitish). They are as a rule of a rather rude description.

All the above are drawn full size. Specimens *d* and *i*, when seen otherwise than on paper, appear very small and tiny indeed. Yet it would be erroneous to suppose them to be mere anomalies or exceptions. Judging from the number of Déné arrow heads in my collection, such diminutive implements form at least one quarter of all the arrow heads now extant.

Lastly, a few points are of a black, very hard and fine-grained stone, differing from the material of all the arrow heads already described. Such is that marked *j*. It is the only one of that description which I have ever seen. It is blunt-tipped, and with hardly any edge or sign of flaking. It has the exact appearance of an implement very much the worse for wear.

There are to-day no well-authenticated Western Déné arrow-heads of bone or ivory in existence. Their tip was not pointed like that of the stone weapons. They were mere beaver teeth in their natural state secured to a shaft. Some of these were also of the root part of the cariboo's antlers, and both bone and horn arrow-tips were considered exceptionally effective.

Fig. 24.

Fig. 25.

In Figs. 24 and 25 I have tried to illustrate the modes of connecting the stone points with the shaft, as formerly practised by our aborigines. Sometimes the shaft was simply cleft open to receive the point (Fig. 24), and sometimes it was slit at the end as in Fig. 25. In either case, point and shank were firmly fastened together with sinew and pitch. The foreshafts used along with the arrows of some American races were unknown here.

The shaft* of the Western Déné arrows was invariably of seasoned amelanchier *(A. alnifolia)* wood. As partially visible in Fig. 25, delicate grooves, one on each opposite side, ran through the shank of the weapon and were intended to facilitate the detection of the game when it had been only wounded. The blood issuing from the wound, by flowing

* κας, a primary root.

freely through these grooves, dropped on the snow or bare ground in a less-scattered condition, thus aiding the hunter in tracking the animal ere it was finally dispatched.

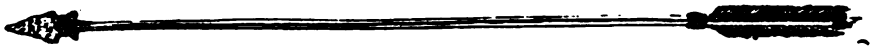


Fig. 26.

Fig. 26 gives a fair idea of a Carrier arrow ready for use. As may be seen, the feathering is triple. The tips only of the feather quills are fastened to the shaft. Sinew and pitch were restored to in order to secure the part of the quills adhering to the shaft end, while sinew alone generally sufficed to fasten the larger or root end of the feathers.

A variety of arrow* which was entirely of amelanchier wood without stone or bone point or shaft grooves did service in connection with target practice or one of the games which shall be described further on. (Chap. VI.)

The Tsé'kéhne, who to this day live almost entirely on the spoils of the chase, formerly far excelled the Carriers in the manufacture and use of hunting weapons. Some of these, which were indeed in actual use among the Carriers, were nevertheless of undisputed Tsé'kéhne origin. Such were the "cut arrow," the triple headed arrow and the blunt arrow.

Fig. 27.

The "cut-arrow" (*'kra-tcən-kwəɟ*, lit. "arrow-stick-cut off") was so called on account of its peculiar shape (fig. 27). Its point was made of a cariboo horn and "was awl-like in form. Its broader extremity was hollowed out to receive a wooden shaft which served to dart it off from the bow as a common arrow, with this difference however that, when in motion, the horn point detached itself from the shaft. This projectile was deadly, and intended only for use against a human enemy or for killing large game."†

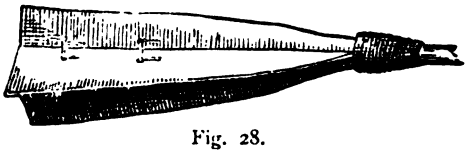


Fig. 28.

To shoot smaller game they had recourse either to the triple headed

* *'kɛ-squh*, verb. noun, meaning as far as it can be translated: "it shoots in as far as the feathering."

† The Western Dénés, etc. Proc. Can. Inst., Vol. VII., p. 140.

arrow shown in fig. 28, or to a wooden blunt arrow (fig. 29). The former* consisted of three flat pieces of bone, or more generally horn, cut transversely at their broadest extremity and fastened to the shaft through their smaller end and sides by strong sinew threads. It did good service even against large animals, and it is not more than 40 years since it has entirely fallen into disuse.

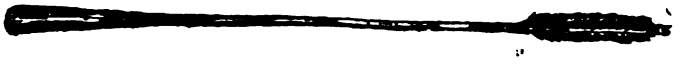


Fig. 29.

The latter† has been drawn from a specimen obtained from a Tsé-'kéhne who, in common with the majority of his fellow huntsmen, to this day finds this simple and primitive looking projectile invaluable against grouse, rabbits, etc.

Even such an apparently insignificant act as that of releasing the arrow while shooting has been analyzed so as to yield modern scientists material for ethnic divisions. Professor Morse thus classes the different methods in vogue among American, European or Asiatic archers :—

(1) *Primary.*—The notch of the arrow is grasped between the end of the straightened thumb and the first and second joints of the bent fore-finger. It is practised by children generally, and by the Ainos, Demeraras, Utes, Micmacs, etc.

(2) *Secondary.*—The notch of the arrow is grasped with the straightened thumb and bent fore-finger; while the ends of the second and third fingers are brought to bear on the string to assist in drawing. Practised by the Zunis, Ottawas, etc.

(3) *Tertiary.*—In this release the forefinger, instead of being bent, is nearly straight with its tip as well as the tips of the second and third fingers, pressing or pulling on the string, the thumb, as in the primary and secondary release, active in assisting in pinching the arrow and pulling it back. It is practised by Sioux, Arapahos, Cheyennes, Assiniboins, Comanches, Crows, Blackfeet, Navajos, Siamese, Great Andamanese.

(4) *Mediterranean.*—The string is drawn back with the tips of the first, second and third fingers, the balls of the fingers clinging to the string with the terminal joints of the fingers slightly flexed. The arrow is lightly held between the first and second fingers, the thumb straight and inactive. Practised by nations around the Mediterranean, by modern

* *Tarwɔs*, second. root.

† *Thɔs.*, prim. root.

archers, Flemish (using first and second fingers only), Eskimos, Little Andamese.

(5) *Mongolian.*—In this release the string is drawn by the flexed thumb bent over the string, the end of the forefinger assisting in holding the thumb in position. The thumb is protected by a guard of some kind. It is practised by Manchus, Chinese, Coreans, Japanese, Turks and Persians.*

Our Carriers followed the first or primary method of arrow release, while the Tsé'kéhne conformed to the fourth or Meditterranean. I am not acquainted with that in vogue among the prehistoric Tsi|Koh'tin. The above details are given to show to what advantage even the slightest differences in the performance of an act common to all primitive peoples can be turned by the acute observer and reflecting scientist.

Although the scope of this paper, to be consistent with its heading, should be restricted to stone implements, I feel that I cannot well separate bows from arrows in my treatment of the weapons of the chase. As far as my information goes, three varieties of bows, exclusive of cross-bows, obtained among the Western Dénés. Of these two were proper to the Tsé'kéhne, and the third to the Carriers and probably the Tsi|Koh'tin as well.

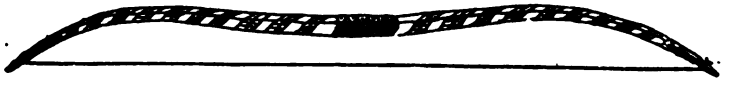


Fig. 30.

The regular hunting or war bow of the Tsé'kéhne was of mountain maple (*Acer glabrum, Tow.*) and five feet and a half or more in length. The edges, both inner and outer, were smoothened over so as to permit of strips of unplaited sinew being twisted around to ensure therefor the necessary strength. These pieces of sinew were fastened on with a glue obtained from the sturgeon sound, which also did service for all kinds of gluing purposes among each of the three tribes, while still in their prehistoric period. The central part of the bow, which was so thick as to appear almost rectangular, was finally covered with a tissue of differently-tinged porcupine quills.

Great care was taken to obtain a bow-string impermeable to snow and rain. With this object in view, delicate threads of sinew were twisted together and afterwards rubbed over with sturgeon glue. This first string was then gradually strengthened by additional sinew threads twisted round the first and main cord, each overlaying of sinew being

* See Anthropology in 1886, by C. T. Mason, p. 538.

thoroughly saturated with glue. Finally when the string had attained a sufficient thickness for efficient service, it was repeatedly rubbed over with the gum of the black pine (*Abies balsamea*).

Fig. 31.

A less elaborate bow (Fig. 31) is still to this very day in use among the Tsé'kéhne in connection with the blunt arrow already mentioned. It is of seasoned willow (*Salix longifolia*), and being devoid of any sinew backing or other strengthening device, its edges are more angular than those of Fig. 30. Its string consists merely of a double line of cariboo skin slightly twisted together. The specimen figured above measures four feet ten inches.

Fig. 32.

The Carrier bow was never much more than four feet in length, and the wooden part of it was invariably juniper (*J. occidentalis*). Instead of being twisted around as in the Tsé'kéhne bow, the shreds of sinew were glued on the back after the fashion of the Eskimo bow, with this difference, however, that in the Carrier weapon the sinew was not plaited. When a layer of thin sinew strips had been fastened lengthwise on the entire back of the bow, it was allowed to dry, after which others were successively added until the desired strength had been obtained. A process analogous to that whereby the Tsé'kéhne bow-string was made was followed in cording the string of the Carrier bow.

It is hardly necessary to remark that both of the aforesaid war and hunting bows disappeared almost simultaneously with the establishment of the North-West Company's posts throughout Western Déné territory. However, it may be said that as late as 60 years ago fire-arms were still *desiderata* among the poorest class of Aborigines.

Here is a Tsé'kéhne crossbow* of modern manufacture. It does duty against small game or for target practice, and is also used by children as a plaything. Although the old men assure me that they have always seen such weapons among their fellow huntsmen, I cannot believe that cross-bows were known to the original Tsé'kéhne. It is much more probable that they have been derived from the band of Iroquois established in close proximity to the territory of the Beaver Indians. My purpose in

*Tl'ôn t, "that which darts off," in Tsé'kehne.

mentioning them here is to show that the faculty of self appropriation and adaptiveness which more particularly characterizes the Carrier mind,

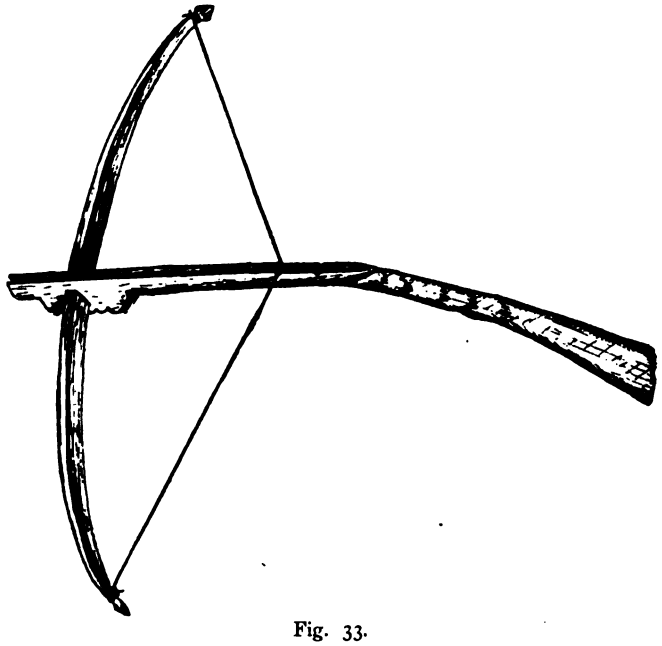


Fig. 33.

is, to some extent, shared in even by the Tsé'kéhne tribe which to this day has little reason to boast of its material progress.

A detail which it may also be worth noting is the mode of holding the bow while shooting. The Carriers, who almost invariably knelt while shooting, held it in a horizontal position, while the Tsé'kéhne used it perpendicularly, one end of the weapon resting on the ground.

To return to stone implements. Besides the arms already described the Western Dénés had recourse, when on the offensive, to five other varieties of weapons; the spear, the dagger, the war club, the temple-lancet or skull-cracker, and what might be termed the counterpart of the modern bayonet.

This latter arm was called *ɔɟthï'-la-dîn'ai** which may be freely translated "fixed at the end of the bow." Its name explains its nature. It was brought into requisition by the warrior or the hunter when too closely pressed by the enemy to shoot, and was used as a spear. Such points were of identical material with that of arrow-heads, *a*, *b* and *c*, fig. 23, and were chipped to the shape of figs. 34 and 35. The latter point is rather ruder in appearance than the average bow-points. Indeed from

* Lit. "bow-end-appended to;" plural. *ɔlthi-la-dînla*, a verbal noun.

the cut giving a side view of it, it would seem that it had been left unfinished. These weapons were inserted in a slit at one end of the bow

Fig. 34.

Fig. 35.

(fig. 32) and securely fastened therein with pitch inside and pitch and sinew outside.

Fig. 36, ½ size.

Fig, 37, size.

The spear heads * in nowise differed from the bow-points, save perhaps that they were generally larger in proportions and narrower at the base. Herewith are shown representative specimens. Fig. 37 is, by exception, of felspathic slate. Its shape and make would suggest to the archæologist a comparison with the laurel leaf points of the so-called Solutrian epoch. It is drawn full size. One of its surfaces shows hardly any trace of flaking and almost perfectly flat.

In fig. 38 we have a type of a very different description. It lacks the exquisite finish of the preceding and is double-pointed, so that the base is not easily distinguished from the tip. As may be seen from the outlines of its side, its shape is far from elegant.

Fig. 38.

Fig. 39.

All of these spear heads were hafted to a pole five or six feet long pretty much after the mode of connecting the arrow heads with their shaft.

* The heads of these and all missile weapons are called *nūntaī'*. The spear, shaft and point, is named in Carrier *ɔɒR-thɔz*, or "hook-staff."

To all appearances, the stone daggers* of the prehistoric Dénés were distinguished from their spears by two peculiarities: the shortness of the handle and the greater dimensions of the blade. I would call the attention of antiquarians to the size, shape and finish of the above illustrated dagger blade (fig. 39). Although evidently broken off at the tip end, it is still fully 8½ inches in length and 3 inches in width. Yet it is not more than ⅜ of an inch in its greatest thickness. It has been chipped off to an almost perfectly flat surface, the flakes being as in the Solutrian implements remarkably large and shaving-like. Nevertheless this exquisite relic of prehistoric workmanship has been found, not in the cavern of Solutré, but scarcely two hundred yards from where these lines are written. I may add that it was found on the surface of the ground† and is of exactly the same material as the great majority of Dené arrow heads.

The Dené dagger was carried about hanging from the belt through a a leather thong, as is now done with its modern substitute, the steel poniard.

Fig. 40. ⅓ size.

* *Mecyal*, second cat.

† The foregoing had been written for some time when I came across the following passage of Mr. D. Boyle's Archæological Report for 1891 (p. 10) which I had overlooked in the haste of the first reading: "While many specimens (especially flaked ones) found in different parts of the province, may be classed as palæoliths, they have, up to the present time always been found associated in such a way with neoliths that it is impossible to designate them as polæoliths with any degree of certainty. Leaf-shaped "flints" have been picked up that are quite as rudely formed as any from the deepest stalagmite deposits of Europe, but never in situations to suggest that they are other than rough-hewn tools or weapons, which, as such had a purpose in the economy of people who are capable of producing better things. Until we find specimens of this kind, as Dr. Abbot found them in the Trenton gravels, or in some situations isolated from all others, or distinct as to material or coating from specimens of a superior quality in the same neighbourhood, we shall not be warranted in making any distinction relative to time of possible production." It is gratifying to hear of would-be palæoliths being found even in Eastern Canada alongside with neoliths, for this coincidence appears to me a confirmation of the opinion that, in America at least, these divergences of type are suggestive less of distinct epochs than of unequal skill in the craftsmen, or possibly ethnic difference in the race, that produced them. I am persuaded that had Sir. A. Mackenzie examined with the care of an antiquarian the arms of the Western Dénés whom he met one hundred years ago, he would have found both styles co-existing among them.

Apart from the above missile and cutting arms, the Carriers and Babines possessed two other offensive weapons of stone, which they called respectively, R*əl* and *thəl'tə*R.

The first is the war club of which at least two different types existed.

Fig. 41.

Fig. 40 is a club of a grayish basaltic rock which has been treated to a partial polish only, as its surface is naturally smooth. A variety of the same was of bone, or more generally of cariboo horn. Its shape and use were identical, but its length was about double that of the stone weapon. Fig. 41 represents a club of a different and perhaps more common pattern. It is of carefully pecked granite, and though the specimen illustrated is imperfect, the base and knob being wanting, I have had no difficulty in reconstituting it to its original form after other similar weapons I have seen in several parts of our district. To the knob at the small end was fastened a buckskin line which, being firmly wound around the wrist and hand of the warrior, ensured the safe keeping of the weapon amidst the excitement of the fray.

The skull-crackers,* vulgarly called "tommy-sticks," of the plain Indians of the North-West Territories, are well-known even to others than archæologists. I have never suspected their presence among the ancestors of our present Déné population west of the Rockies until last year, when the example (fig. 42) was found in Hwotsu'tin territory. It came as a revelation upon the Carriers, none of whom was found who could do more than guess its use. It is somewhat peculiar in appearance, and its groove is but rudely and irregularly formed.

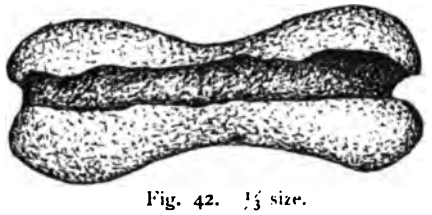


Fig. 42. ⅓ size.

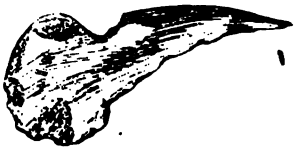


Fig. 43. ½ size.

The innocent-looking little piece of partly polished stone designed in fig. 43 was, in the hands of a Babine Indian, a rather treacherous weapon. It is the temple-lancet or skull-cracker * referred to above. After it had been securely hafted to a wooden handle three or four feet

* *Thəl'tə*R.

long, stone lancet and handle forming, when connected, a scythe-like implement, the warrior—or indeed assassin, as the case may have been—struck therewith his victim on the temple, oftentimes thus causing instant death.

Before bringing to a close this chapter devoted to stone implements, it may not be amiss to say a word concerning the art of stone chipping as practised by the prehistoric Dénés. I remember having read in a publication emanating from a learned society, an elaborate dissertation on this subject wherein the author took great pains to elucidate difficulties which to me appeared to be mainly of his own making. It may be that the rules of the craft varied with the localities and the material employed; but here, among the Western Dénés, there was no great mystery about the operation.

The material chosen in preference to fashion arrow or spear heads with was loose, broken pieces of the rock such as were found on the surface. Of course these were confined to a few localities only, wherein were situated sorts of quarries which were very jealously guarded against any person, even of the same tribe, whose right to a share in their contents was not fully established. A violation of this traditional law was often considered a *casus belli* between the co-clansmen of the trespasser and those of the proprietors of the quarry.

The first operation consisted in roughly blocking off with a hard stone the pieces of the flint, the removal of which was necessary to obtain a vague resemblance to the intended weapon. Then grasping the flint lengthwise with the closed fingers of the left hand (fig. 44), the arrow-smith carefully pressed off the flakes with an elongated stone held in his right hand, until the desired form and finish were obtained. A piece of buckskin served as a pad to protect the hand against the asperities of the point.

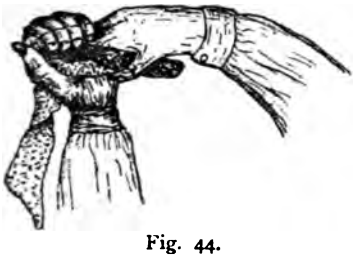


Fig. 44.

I owe these details to an old chief who has been an eye-witness to the operation. I should add that in not a few cases a moose molar tooth replaced the long chipping stone. I know also of a very few points the sharp edges of which have been polished off by friction.

CHAPTER IV.

BONE AND HORN IMPLEMENTS.

Several bone or horn objects formerly in use among the Western Dénés have already been mentioned in connection with stone implements of congenerous nature. As they were mostly weapons or working tools which have long been replaced by iron or steel substitutes, few of them could be illustrated from existing specimens. Such as will be found described in the present chapter are, however, still largely used by the natives, even of the Carrier tribe.

Fig. 45.

They are, with few exceptions, industrial implements. Among those which serve in connection with hunting or trapping, one of the most conspicuous is the *tsa-yu-thej* (beaver-medicine-recipient, or castoreum bottle). As will be seen further on, this same vessel is of birch bark among the Carriers. But the Tsé'kéhne, who are essentially huntsmen and whose country abounds in large game, make it out of a cariboo horn, and adorn (?) it with such primitive designs as may be noticed in fig. 45. Therein the trapper keeps the castoreum which he dilutes either on the steel trap, or in the mud contiguous thereto, in order to decoy the beaver into its ultimate capture.

Of course this mode of trapping is practicable only during the spring or summer months. In the winter, beaver is sought after with nets set in holes cut in the ice a short distance from the rodent's habitation and store. I have elsewhere given an account of this winter trapping which will, perhaps, bear reproduction here. "Once they have found his [the beaver's] lodge, an indispensable preliminary to secure his capture is to discover the exact location of his path or trail under ice. It appears that he follows well marked routes when swimming from, or returning to his winter quarters. These our Dénés easily find out by sounding the ice in different directions with cariboo horns. Their well exercised ears readily discover by a peculiar resonance of the ice where the rodent's usual path lies. So, at a given point, they cut a hole wherein they set their babiche beaver net,"* taking care to plant at a short distance a

* "The Western Dénés," etc., Proc. Can. Inst. vol. vii., p. 131.

stick the upper end of which is provided with little bells—the counterpart of the beaver nails and pebbles which did duty in prehistoric years. To this upright stick the side ropes of the net are attached in such a way as to be ready for use when the game is to be ensnared. "Then the hunter (should I not say fisher?) proceeds to demolish the beaver's lodge, in order to drive him off. Should the game not be found there the same operation is repeated at his adjoining provision store. When the undulations of the water tell of his presence therein, he is frightened away to where the net is set. Supposing that the beaver is swifter than his hunter and reaches the net before the latter, the efforts he will make to extricate himself therefrom will agitate the small bells before mentioned, and the hunter will immediately make for the hole and draw him out before he has time to cut himself clear of the net."*

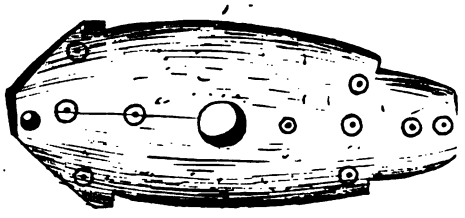


Fig. 46.

Fig. 46 represents the *mas*, a bone device indispensable to the efficiency of the beaver net. It is attached to the end of the net which is laid out at the opening in the ice wherein it floats on the water. The side strings of the net are passed through the centre hole of the bone piece (mas) and thence connected with the little bells at the top of the outstanding stick, so that by pulling them up, the farthest end of the net, which is under ice, will be drawn back to where the mas is secured, and thereby the game will be bagged, as it were, and speedily killed on the ice. These bone pieces affect divers forms, several of which are symbolical. Thus the mas shown above, is intended to represent a beaver. It will be remarked that the design is highly conventionalized. Yet, even a child (of Déné parentage, of course) will recognize at once its significance.

Barbed harpoons† such as those shown in the accompanying figures are resorted to when the Déné is out beaver hunting—not trapping or snaring,—that is in such cases as when the beaver is met with free of any trap or net. Until a short time ago those beaver harpoons were made of cariboo horn; but to-day implements of identical shape wrought out of steel files or pieces of iron have almost entirely superseded the

* *Ibid*, p. 132.

† *ʒta-t'sɔn*, "lip or barb-bone."

original horn weapon. To-day, as formerly, they are securely fastened to a handle three or four feet long, wherewith they are launched at the

Fig. 47. ½ size.

game much as would be done with a regular lance. The shaft is intended to secure greater impetus and efficiency to the weapon. The specimen illustrated by fig. 47 is a find, and is therefore more ancient

Fig. 48. ½ size.

than that shown in fig. 48 which is quite modern. A comparison between these implements and those of similar intent in use among widely different races of Indians all over North America cannot fail to elicit the remark that the same needs create the same means. *

In the act of dressing hides several bone or horn implements are still used among the Western Dénés. These are the fat-scraper, the hair-scraper, the bone-awl, and the skin-scraper.

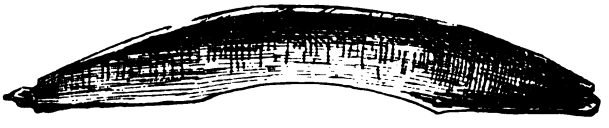


Fig 49.

The first† is made of a split cariboo horn (fig. 49) and, as its name indicates, it serves to scrape off the fat adhering to the fresh skin. This fat is received in the concave part of the implement and thence transferred to a bark vessel close by. In the form above delineated, it is more of a Tsé'kéhne than of a Carrier tool, and as such it does service more particularly in the treatment of marmot (*Arctomys monax* and *caligatus*) and wild goat (*Aplocerus montanus*) skins.

The Carrier equivalent therefor generally consists of the socket end of the shoulder blade of the cariboo, left almost in its natural state.

---

* *See* Ann. Rep. Canad. Inst. 1888, p. 58, figs. 100, 101.

† *Pe-tha-ɔtzo*, "wherewith the flesh-side is scraped" (of a liquid or fat substance): fourth category of nouns.

This implement is used in connection with grease or fat scraping of any description.

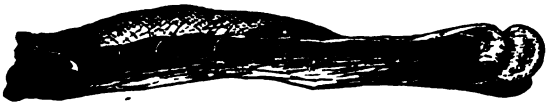


Fig. 50. ½ size.

Once the hide has been freed of most of its fat and blood, it is soaked in cold, and then in warm, water, after which one of its extremities is lashed up around the smaller end of a stout pole leaning on any kind of support, a wall, a fence, etc. The hair is then removed by energetic action on the skin hanging down over the pole with a scraper* formed of the tibia of a cariboo (fig. 50). By reason of the peculiar tenacity of the hair, moose skins are now operated on with a short curved steel knife. But the bone instrument shown above is still very extensively employed in connection with any other kind of hair scraping.

After having been thoroughly rubbed with the brain of the animal, its skin is next extended within a wooden frame as is practised by most tribes of Aborigines. The holes near the edges through which the line

Fig. 51.

Fig. 52.

which fastens it to the frame is passed, were formerly and are still in some localities, pierced with bone awls† identical in form and material with those occasionally found in mounds. They are of the fibula bone of the cariboo, or, as in fig. 52, of the black bear. The latter are more common among the Tsi|Koh'tin. In times past such awls were resorted to whenever any skin or bark perforations, such as are incident to the art of canoe building or sewing bark vessels, were found necessary. They are now obsolete, steel having almost entirely replaced bone in the fabrication of any such tools. Yet the specimens illustrated above were in use among the Carriers and the Tsil|Koh'tin immediately prior to their being given me.

---

* *Pe-na-alqé*, "wherewith one scrapes off" (*i.e.*, hair); fourth category.

† *Ghwet-tsaz*, "knee-bone awl"; third category.

The object in view while spreading the skin in its wooden frame is to remove its "mack" or inner cuticle. This is accomplished by means of bone scrapers,* which are everywhere essentially the same, but whose form or even material varies according to the tribe by which they are used.

Fig. 53. ⅓ size.

Thus the Tsi|Koh'tin scraper (Fig. 53) is of bear bone and wedge-like in form. The skin wrapping shown in the cut is quite often wanting.

Fig. 54. ½ size.

The Carrier scraper (Fig. 54) is of cariboo bone and shaped somewhat like a chisel. Its main peculiarity consists in the teeth cut in its edge to prevent its slipping too easily over the skin and ensure better gripping power. Identical implements are at times found as relics of extinct races in many parts of the northern American continent, and I still remember how the perplexity as to their probable destination evidenced through the lines of an antiquarian, who some years ago was describing one of them, brought home to me the advantages enjoyed, even from an archæological standpoint, by persons actually passing their life among the aborigines.

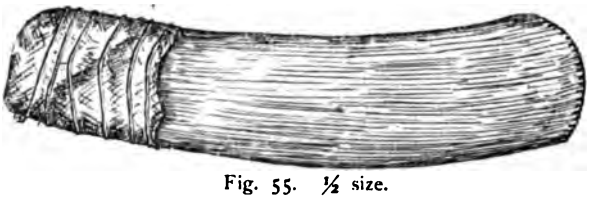


Fig. 55. ½ size.

Among the Tsé'kéhne the skin scrapers are of cariboo horn, thinned and reduced to the form of that delineated in fig. 55. A piece of buckskin wrapped around the end held in the hand facilitates the handling of that rather awkward implement. The serrated edge of the Carrier scraper is also reproduced by the Tsé'kéhne. Or indeed it is quite as likely that the Carriers have learned this peculiarity from the Tsé'kéhne, who in their turn have borrowed it from the Crees and other Algonquian

* *Ɣt'ha-nkwɔt*, "it scrapes (by pecking) the flesh side."

tribes of the East, all of which observe it in making their skins crapers, while the Tsi|Koh'tin, who are the most distantly situated from them, seem to be ignorant of it.

All of these scrapers also do service in the process of skinning animals as means of separating the hide from the flesh.

If we now pass from bone implements connected with hunting to such as are laid under contribution as means of furthering the fishing industry, we may note in the first place the *ta-krét** or fish harpoon (fig.

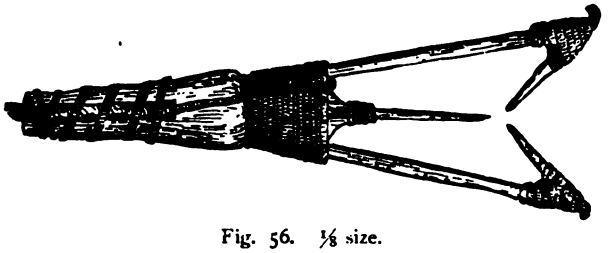


Fig. 56. ⅛ size.

56). The cut renders a detailed description of it unnecessary. The only wooden parts are the shaft and the socket, round which is wound the skin line which fastens the two side-hooks of the harpoon, while it secures in its proper place the middle prong. The hook pieces are fastened with sinew. An archæologist fond of comparisons cannot fail to notice the resemblance of this weapon to its Eskimo equivalent such as illustrated in fig. 453 of Dr. F. Boas' "The Central Eskimo."† The ta-krét serves to dart a large species of white-fleshed salmon (*Oncorrynchus chouicha*, Walbaum), called *kes* by the Carriers and *qes* by the Tsi|Koh'tin. Nowadays these implements are mostly of iron or steel; but their shape has remained unaltered.

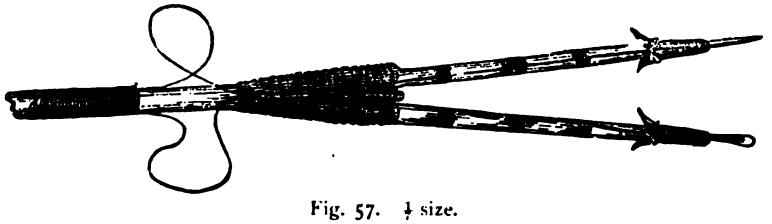


Fig. 57. ¼ size.

The Tsi|Koh'tin spear salmon with a harpoon of a totally different pattern (fig. 57). It is double darted, and so made that upon fastening in the flesh of the fish, both darts detach themselves from the forked shaft to

* "Lip-dart," by allusion to its mouth-like appearance.

† Sixth Ann. Rep. Bureau of Ethnology, 1884-85.

which they are secured by means of a plated raw-hide line. The whole detachable points of this implement were originally of mountain sheep horn; but in modern specimens the tip is generally of iron and occasionally of copper, the barbs only being of horn.

Both the Carrier and the Tsi|Koh'tin harpoons are hafted to shafts sometimes as much as 12 or 15 feet long, so as to render them serviceable from the top of rocks or precipitous river banks emerging from the rapids where that species of fish is wont to congregate.

Implements of that size are designed exclusively for salmon fishing. For smaller fish, besides the nets, which will be described in their proper place, the Carriers have recourse to a bone or steel harpoon of analogous model with that of fig. 56, but reduced in dimensions and hafted to a short handle. If in the winter time, bait is used as a means of attracting the fish. Having cut in the ice a hole of sufficient diameter to observe the movements of the trout underneath, the Carrier drops and gently

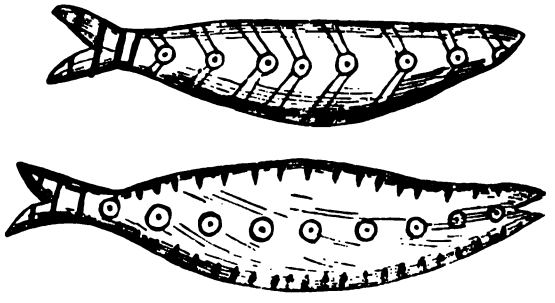


Fig. 58.

oscillates in the water bone imitations of Coregone fry (fig. 58), hanging through a sinew line from a wood or bone piece held in the left hand. Upon biting the bait, the fish is speedily speared with the above mentioned harpoon.

Here (fig. 59) we have a fishing implement which, though of a rather primitive style, yet requires but little explanation. The lancet or pin-like part of the hook* only is of bone, while the shank is of wood. This implement is drawn natural size. In remote localities, during hunting expeditions away in the woods, it is found to this day very serviceable.

A fishing device less modern in appearance is shown in fig. 60. It is called by the Carriers *thé-sateñ* a word which cannot be better translated than by "lying on the bottom," though the actual equivalent of that phrase would be *théR-əsthan*. A very small fish is used as bait and fastened in

* *Qəs*; prim. root.

this wise to the implement; the whole of the bone pin including the sinew line to which it is attached is passed through the anal part of the fish

Fig. 59.

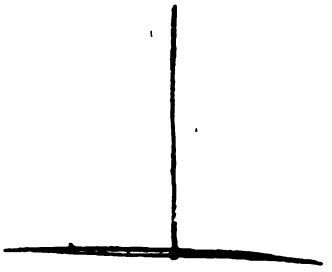


Fig. 60.

and then one-half of it is inserted lengthwise through the body of the fish commencing from the point of initial insertion of the sinew line to the head, after which the whole is dropped in the water and held as in the case of the bone coregone bait. The larger fish, generally the loche or turbot (*Lota maculosa*) which is very voracious, overlooks the other half of the implement left bare, and by gulping down the small fish gives warning to the fisherman, who instantly pulls up the whole, thereby sinking the bone pin in the gills of the large fish which is thus easily secured.

As a rule, the small end bones of the loon's wings, or occasionally even young beaver ribs, are the material chosen to make the two last mentioned implements. The same probably served also to fabricate the needles of the prehistoric Dénés. But none of them is now extant, and this may be a mere conjecture.

Before proceeding further, a word about the species of fishes more extensively sought after by the Carriers and the Tsi|Koh'tin may not be out of place. They are of course very numerous, but king among them all is the salmon, and of the five species which are now known to ascend their rivers, the suck-eye (*Oncorhynchus nerka*, Walbaum) or *tha-llo* * is by far the most important either on account of its economic value or of the prodigious numbers of its annual run. Next in abundance and

* "Water-fish."

importance as an article of diet is the large white flesh salmon or *kes* which has already been mentioned. These two species are common to most of the streams within Carrier, Babine and Tsi[Koh'tin territory, though the latter avoids not a few minor tributaries of the large rivers. One is particular to Babine lake and outlet—it is the hump-back salmon* (*O. gorbuscha*, Walb.) It is not of much value. The two other species, *thestlé*† and *ta-tzəR*‡ in Carrier are quite plentiful in such streams as discharge their waters through the Skeena river; but according to local observations they make their appearance in Stuart's Lake and immediate outlet only when the next run of the tha-llo is to be extraordinarily large. As far as I can judge the *thestlé* is the *O. keta* of Walbaum, such as described by Jordan and Gilbert;§ but I can find no specific name for the ta-tzəR, whose native name is an exact translation of the scientific word for all the Pacific Salmons: ὄγκος, hook; ῥυγχος, snout; Carrier: *ta*, snout (and lip); *tzəR*, hook.

To the above should be added the *kĕsəl*‖ or land-locked salmon (*O. Kennerlyi*), which is much appreciated by the native palate and captured mainly with the help of fish traps or *'kuntzai*. It is however inferior in point of economic importance to the great lake trout (*Salvelinus namaycush*, Walb.) called *pît* by the Indians and which is extensively sought after either during the autumn months or the cold season. In the former case it is quite frequently dried and cured as the red salmon or thal o. The other trouts to be found in Déné lakes or rivers are the common trout (*Salmo purpuratus*, Pallas) and the bull trout (*Salvelinus malma*, Walb.) There are also two species of whitefish, the *Coregonus clupeiformis* (Mitch.) and the *Coregonus quadrilateralis* of Richardson, which in some localities are caught in such large quantities that many thousands are usually kept frozen for use during the winter.

The above are, of course, the best fish available here. But as the child of the forest has not always the choice of his diet, he must more often than once content himself with such carps or carpiodes, such suckers or catastomidæ as may chance to venture too near his drag-net. These seldom fail him. Their name is legion, and I will not be so rash as to attempt a nomenclature of them.

---

* *Stəm'on*, a word which to a Déné ear appears quite foreign.

† A noun of the second category.

‡ "Lip (and snout)-hook."

§ Synopsis of the Fishes of North America by D. S. Jordan and Ch. H. Gilbert, Washington, 1882.

‖ Almost equivalent to "small *kes*" or white flesh salmon.

I did not mention the sturgeon (*Accipenser transmontanus*, Richardson), because, although it is a welcome visitor to our lakes, its visits are too rare and far between to entitle it to serious consideration in this connection. It is caught in large meshed nets.*

To join the two extremes, I will add to the sturgeon, the largest of our fresh water fishes, the *thɂmək*,† a very small fish which I think is not known to Ichthyology. It frequents a few little lakes only, and is taken with scoop-nets during the few mild days which usually interrupt the severity of our winters. The quantity of that fish brought home after one single afternoon's absence from the village is sometimes really enormous.

To be complete I should have noticed among bone implements serving fishing or trapping purposes, the *ətté*,‡ or ice-breaker. This is, however, a mere pointed cariboo horn, which tends to disappear as a working tool, being gradually replaced by a piece of iron or steel, whenever this can be obtained.

There is a horn wedge which, even at the present day, serves to split the slender rods of which are made the *'kuntzai* or fish baskets, which shall be described in the chapter devoted to wood implements. As in most implements requiring hard material, cariboo horn is chosen to make these wedges.

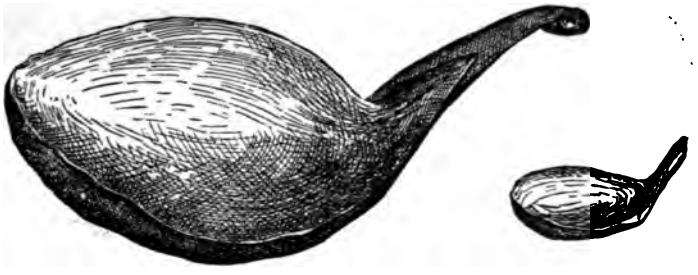


Fig. 62. ¼ size.

The above figure requires no explanation. A glance at the horn ladle

* The Carrier name of the sturgeon is *ɟe-tco*, "big-fish."

† A root of the second category, the first syllable of which refers to the lake bottoms from which these fishes seem to suddenly emerge.

‡ *ɟtté* means "horn," and is used to designate even steel ice-breakers. The ancient name for them is *tzoñtziɂ* in Carrier which is evidently identical with the present *tzoroñtziɂ* of the Tsɂkoh'tin.

and spoon therein represented will show that our Western Dénés' handiwork is of a very poor grade indeed compared with that of the elaborately carved Haida, Tsimsian or Tlingit spoons. The only attempt at

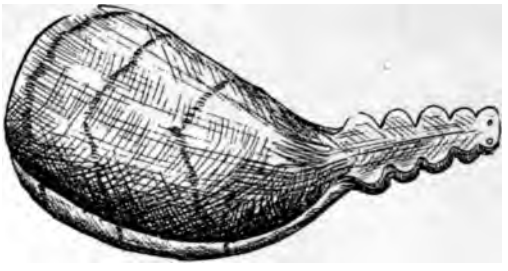


Fig. 63. ¼ size.

design or ornamentation of any kind appears in the Tsé'kéhne spoon or ladle (fig. 63). Genuine Carrier utensils of this class, which are either of wood or of horn, are even plainer than those above illustrated. Evidently our Dénés have no eye for the beautiful. In all cases of horn spoons the material is mountain sheep horn.

The manufacture of such household implements necessitates the possession of no extraordinary amount of skill. After the horn has been split in two equal halves, a spherical, smooth-surfaced stone is heated, and to expand the too contracted sides of the horn they are applied thereon and gently pressed out, a layer of pitch having previously been spread over the stone so as to give consistency to the material of the spoon and prevent its artificially distended parts from returning, when cooled, to their original shape. The finishing touches are then given with the carving knife.

Keeping within the same class of industrial bone implements, we come on the bark peelers* and the cambium scrapers.† Both of these are in great demand every recurring spring for the purpose of extracting for food the cambium layer of the shrub pine (*Pinus contorta*). Their name sufficiently describes their use. Below is the Carrier type of both peeler and scraper, which, it should be remarked, are oftentimes much larger than those after which fig. 64 has been drawn. In fig. 65 we have a double-edged scraper, which, though known among and sometimes used by the Carriers, is more frequently seen among the Tsé'kéhne. The various styles of these useful implements are all of cariboo horn. The

* *Enit'qɔl*, "it penetrates by tearing," a verbal noun.

† *Eltzo*, "that which scrapes," verb. noun.

shavings like cambium thereby obtained is much relished by the natives,

Fig. 64. ½ size.

who even collect it at times for the purpose of drying and keeping for use during the winter months.

Fig. 65. ½ size.

If from the indispensable or useful we pass to the agreeable, the gambling sticks formerly used among our aborigines may claim our attention. Here, again, we find the elegantly-carved gambling sticks of the West Coast tribes replaced by simple polished pieces of lynx or other animal's bones without any particular design, and with the mere addition to one of the pair of the sinew wrapping necessary to determine the winning stick. The Babine specimens (fig. 66) are rather large and must prove awkward in the hand of the gambler. But they have the reputation of being preventive of dishonesty, if distinctions between the honest and the dishonest can be established in connection with such a pastime as gambling. Such of these trinkets as are hollow have generally both ends shut with a piece of wood, and contain minute pebbles and gravel which produce a gentle rattling sound in the hand of the native, much to his own satisfaction.

Fig. 66. ½ size.

Fig. 67 represents the Tsi|Koh'tin and fig. 68 the Tsé'kéhne equivalent of the Babine gambling sticks. It will be seen from the latter that the Tsé'kéhne, who are the most primitive and uncultured of the three tribes whose technology is under review, are again the only people who in this connection, as with regard to their spoons, have made the merest attempt at bone carving.

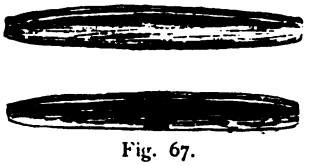


Fig. 67.

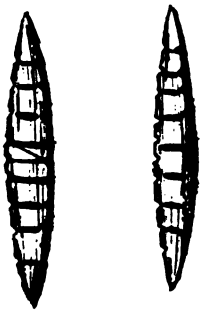


Fig. 68. ½ size.

The game played with these bone pieces is, I think, too well known to demand a description. The jerking movements and passes of hands of the party operating therewith, as well as the drum beating and the singing of the spectators or partners, are practised among most of the Indian races, especially of the Pacific Coast, which have occupied the attention of American ethnologists. The Abbé Petitot says in one of his latest publications* that this game is adventitious among the Eastern Dénés who have borrowed it from the Crees. This remark is no less apposite with regard to their kinsmen west of the Rocky Mountains. Although no other chance game possesses to-day so many charms for the frivolous Western Dénés, the old men assure me that it was formerly unknown among their fellow countrymen. That their testimony is based on fact, the very name of that game would seem to indicate, since it is a mere verb in the impersonal mood: *nət'sə·a*, "one keeps in the hand while moving," and is therefore of the fourth category of Déné nouns. The word for "gambling sticks," such as used in connection with nət'sə·a, is *nə'ta*, which is the same verb under the potential form and means "that which can be held in the hand." Any of the surrounding races, Tsimpsian, Salishan or Algonquin, may be held responsible for its introduction among the Western Dénés, for they are all exceedingly fond of it.

The original counterpart of the modern nət'sə·a was the *atlih*,† which

*I think it is in his book *En route pour la Mer Glaciale, Paris*, 1888.

†May be translated by "Gambling" in a general sense.

in times past was passionately played by the Carriers, but is now altogether forgotten except by a few elder men. It necessitated the use of a quantity of finely-polished bonesticks, perhaps four or five inches long, of which a correct idea may be gathered from fig. 336, illustrating Niblack's "The Indians of Southern Alaska."* These bones were called *altć*, a root word of the second category, implying much greater antiquity than that of the nə'ta

Speaking of atlih, a tradition which has some bearing thereon comes up for a share in the reader's consideration. If of no interest to the archæologist, it will serve a sociological purpose and may have the advantage of furnishing us with a *peinture de mœurs*, as the French have it. Here it is.†

"A young man was so fond of playing atlih that, after he had lost every part of his wearing apparel, he went so far as to gamble away his very wife and children. Disgusted at his conduct, his fellow villagers turned away from him and migrated to another spot of the forest, taking along all their belongings, and carefully extinguishing the fire of every lodge so that he might perish.

"Now this happened in winter time. Reduced to this sad fate, and in a state of complete nakedness, the young man searched every fireplace in the hope of finding some bits of burning cinders, but to no purpose. He then took the dry grass on which his fellow villagers had been resting every night and roughly weaved it into some sort of a garment to cover his nakedness.

"Yet without fire or food he could not live. So he went off in despair without snow-shoes, expecting death in the midst of his wanderings.

"After journeying some time, as he was half frozen and dying of hunger, he suddenly caught sight in the top of the tall spruces of a glimmer as that of a far-off fire. Groping his way thither, he soon perceived sparks flying out of two columns of smoke, and cautiously approaching he came upon a large lodge covered with branches of conifers. He peeped through a chink and saw nobody but an old man sitting by one of two large fires burning in the lodge.

"Immediately the old man cried out: 'Come in, my son-in-law!' The young man was much astonished, inasmuch as he could see nobody outside but himself. 'Come in, my son-in-law; what are you doing out

*Rep. U. S. Museum, 1888, plate lxiii.

†It must be remarked that in the version the most in vogue among the Carriers, the beginning of this legend is very different from that adopted here after Julian *Ɣtetsi-niya* (he walks ahead) of this place, Stuart's Lake.

in the cold?' came again from the lodge. Whereupon the gambler ascertained that it was himself who was thus addressed. Therefore he timidly entered, and, following his host's suggestion, he set to warm himself by one of the fires.

"The old man was called *Nə-yəR-hwolluz* * because, being no other than Yihta,† he nightly carries his house about in the course of his travellings. 'You seem very miserable, my son-in-law; take this up,' he said to his guest while putting mantlewise on the young man's shoulders a robe of sewn marmot skins. He next handed him a pair of tanned skin mocassins and ornamented leggings of the same material. He then called out: 'My daughter, roast by the fireside something to eat for your husband—he must be hungry.' Hearing which, the gambler, who had thought himself alone with Nə-yəR-hwolluz, was much surprised to see a beautiful virgin‡ emerge from one of the corner provision and goods stores§ and proceed to prepare a repast for him.

"Meanwhile, the old man was digging a hole in the ashes, whence he brought out a whole black bear cooked under the fire with skin and hair on. Pressing with his fingers the brim of the hole made by the arrow, he took the bear up to his guest's lips, saying: 'Suck out the grease, my son-in-law.' The latter was so exhausted by fatigue that he could drink but a little of the warm liquid, which caused his host to exclaim: 'How small-bellied my son-in-law is!' Then the old man went to the second fireplace, likewise dug out therefrom a whole bear and made his guest drink in the same way with the same result accompanied by a similar remark.

"After they had eaten, NəyəRhwolluz showed the gambler to his resting place and cautioned him not to go out during the night. As for himself, he was soon noticed to leave the lodge that and every other night; and, as he came back in the morning, he invariably seemed to be quite heated and looked as one who has travelled a very great distance.

"The gambler lived there happily with his new wife for some months. But his former passion soon revived. As spring came back, he would take some alté in an absent-minded way and set out to play therewith all alone. Which seeing, his father-in-law said to him: 'If you feel

---

* Lit. "he-carries (as with a sleigh)-a-house." The final *hwolluz* is proper to the dialect of the Lower Carriers, though the tale is narrated by an Upper Carrier, which circumstance would seem to indicate that the legend is not, as so many others, borrowed from a Tsimpsian tribe.

† *Ursa major.*

‡ *Sak-əšta*, "She sits apart."

§ See the Chapter on the Déné habitations.

lonesome here, my son-in-law, return for a while to your own folks and gamble with them.' Then handing him a set of alté and four *tətquh*,* he added: 'When you have won all that is worth winning, throw your tətquh up over the roof of the house, and come back immediately. Also remember not to speak to your former wife.'

"The gambler then made his departure, and was soon again among the people who had abandoned him. He was now a handsome and well-dressed young man, and soon finding partners for his game he stripped them of all their belongings, after which he threw his tətquh over the roof of the lodge. He also met his former wife as she was coming from drawing water, and, though she entreated him to take her back to wife again, he hardened his heart and did not know her.†

"Yet, instead of returning immediately after he had thrown his tətquh over the roof, as he had been directed to do, his passion for atlih betrayed him into playing again, when he lost all he had won. He was thus reduced to his first state of wretched nakedness. He then thought of NəyəRhwolluz, of his new wife and his new home, and attempted to return to them, but he could never find them."

Fig. 69. ¼ size.

A third chance game was proper to the women and was played with button-like pieces of bone. It was based on the same principle as dice, and, in common with atlih, it has long fallen into disuse. Its name is *atiyéh*.

The three bone implements which remain to be described have likewise disappeared from among the Carriers to whom they were proper. Thus fig. 69 shows a *télni* or ceremonial whistle, which could not at present be identified by one-twentieth of the living Carrier population. It is made of the larger wing bone of the swan, notched near, and slit at, one end exactly as shown in the above figure and without the insertion of any mouth-piece. On great ceremonial occasions, the notable or native nobleman, who was privileged to accompany his dance therewith, kept it constantly in his mouth unsupported by the hand, and from time to time extracted therefrom loud, shrill notes, which added not a little to the liveliness of the scene.

The object represented by fig. 70 differs but little from the preceding, the material being identical and the form almost so. But its use and destination are widely different. It is a *t'sən-'kuz* or "bone-tube"

* A long throwing rod which serves to play another game. It will be figured and explained further on.

† In the biblical sense of *Cognovit*.

through which Carrier and Babine girls attaining the age of puberty had to drink under pain, it was said, of contracting dreadful throat diseases should they attempt to quench their thirst by helping themselves im-

Fig. 70. ½ size.

mediately from the water vessel as was done by common folks. This trinket was constantly carried about, hanging from the sinew and down necklace usually encircling the neck of such pubescent maidens, also as a specific against malign influences.

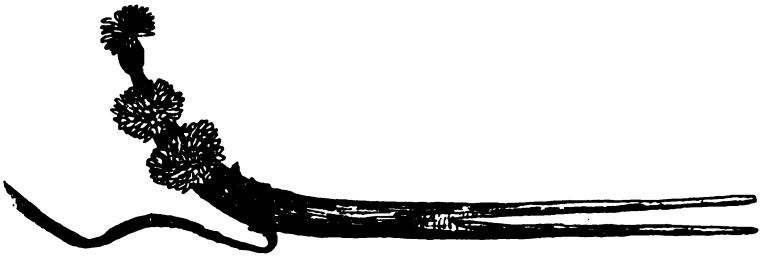


Fig. 71. ½ size.

Closely connected therewith was the double-pronged comb shown in fig. 71. It was worn in the hair and likewise connected with the medicinal (?) necklace through a long, loosely-hanging string adorned with beads, or, in primordial times, dentalium shells or other small articles of native ornament. Its use was not restricted to pubescent girls, but this comb or *tsi-ltsət*,* as it was called, was also common to young men attaining maturity. It should perhaps be remarked that in this latter case the instrument was of wood, not of bone. "Comb" is rather a misnomer when applied to such an object which served merely to scratch one's head with, as immediate contact between the fingers and the head was then reputed productive of fatal diseases.

Apropos of diseases it may be mentioned that bleeding as a surgical operation was, and still is, frequently resorted to by our Western Dénés. So far as my information goes, there was in pristine times no surgical instrument such as an equivalent of our lancet employed in this con-

* "Head-scratches," verb. noun.

nection. It would seem that the operation was formerly performed either with a bone needle or awl, or more commonly with a sharp-edged stone arrow head.

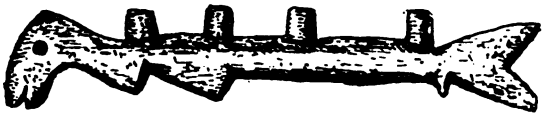


Fig. 72.

Fig. 72 illustrates the change brought in the native huntsman's economy by modern civilization. It is a little piece of bone carved to the shape of a fantastic being, half animal (viz. coyote), half fish, on the back of which little excrescences have been left, the object of which is to hold as many metallic caps for use with a shot gun. This little trinket is fastened to the string of the powder-horn or to that of the shot pouch. It is more commonly cut out of a piece of thick leather without any attempt at design.

CHAPTER V.

TRAPS AND SNARES.

FISH TRAPS.

Judged by their staple food, the Carriers and the Tsi|Koh'tin are maritime or coast tribes, since they mostly rely upon the annual run of salmon for their sustenance during the whole year. But, owing to the topography of their country and their peculiar environments, their mode of securing their supply of the fish materially differs from that adopted by the coast Indians. Nay more, even among themselves the process varies according to the localities and the nature of the fish stream. It may be broadly stated that at least seven different devices are resorted to, which I shall presently endeavour to explain.

In the first place one should not forget that the salmon almost exclusively referred to in the present paragraph, that on which the two tribes named above mainly subsist, is the so-called Fraser River salmon (*Oncorhynchus nerka*, Walbaum). It is exccedingly gregarious in habits and usually plentiful. As will soon be seen, these two peculiarities are taken occasion of by the natives to facilitate its capture.

Where it is practicable the Kamstkadals' method of salmon-fishing is followed. This consists in staking across the river in its whole width and leaving for the fish only narrow passages ending in long, funnel-shaped baskets from which escape is impossible. Owing to the importance of this industry, some detailed explanation of the whole process will not be out of place.

At intervals of forty or fifty feet heavy posts are driven as solidly as possible in the bed of the stream from shore to shore, and on these will depend the strength of the whole structure. As an additional guarantee against the action of the current, as many props or braces are sunk slanting down stream and secured against the upright posts close to the water line. In this and all similar cases the fastening material consists of willow, high cranberry bush or spruce sapling wattle. Finally, heavy poles, as long as can be found, are laid transversely on the forks formed by the intersection of the piles with their props, and the result constitutes what may be called the skeleton of the weir. The intervals between the upright posts are afterwards filled in by poles driven down in the bed of the river, and as these are placed on the upstream side of the

long railing already mentioned, no artificial fastening therewith is required. The weir is then ready to receive the fishing apparatus, which consists of the hurdles,* the bottle-like baskets *nazrwət*† and the narrow terminal baskets, Kəs.‡

The hurdles are made of different sizes, according to the place they are to occupy. They are simply barkless spruce switches, held slightly apart by a few transversal sticks laid against, not entwined with, the trellis work, and there secured by being wattled with wattup or spruce root. The larger number of these hurdles serve to line the upstream side of the weir, thereby closing every possible issue through it, while with the rest are constructed corral-like enclosures guarding the mouth of the baskets, as shown in the accompanying diagram (fig. 73). The

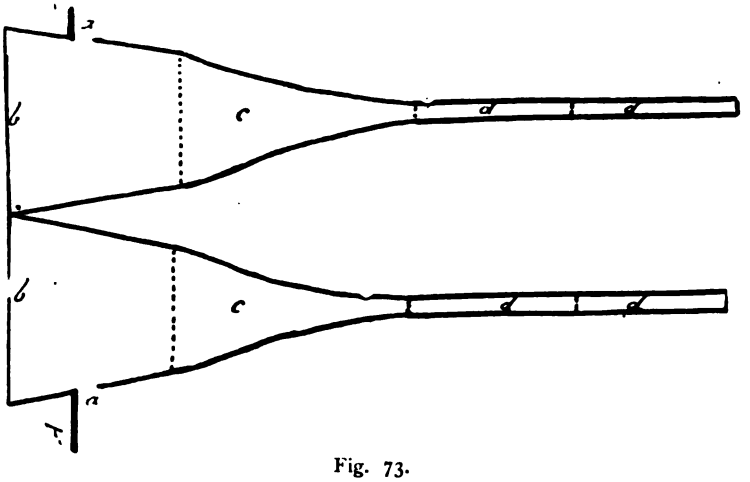


Fig. 73.

entrance to these corrals, and therefore to the trap, is at *a*, and is generally half a foot wide. *A* stand for parts of the barrier or weir. The salmon upon stealing in finds its way up blocked at *b*, and by a sidewise evolution comes in sight of the long conduit prepared for it in the shape of the nazrwət or main basket *c*, together with the narrow terminal cylinders *d*. With a view of liberating itself from the hurdle enclosure, it swims down as far as the terminal cylinders, which, being too narrow to permit of its turning back, thus determine its capture. Others following will soon pack even the broader end of the nazrwət to such an extent that oftentimes no moving room is left. The dotted outlines in

* *ʔcə-stʃu*, a contraction of *tcən-stʃu*, "stick-twined."

† A contraction of *nanɨzrwət*, "cylindrical at the mouth (and long in body)."

‡ Prim. root. Means any long, slender and smooth-surfaced appendage, as a handle, a stem. So named because it is considered as the handle of the funnel-like basket or *nazrwət*.

the above diagram represent the end of each basket which, it is useless to add, is left opened so as to afford a free passage for the fish. Such traps are generally constructed in pairs as is shown above.

Instead of shutting with trellis work the furthest end of the last Kəs or narrow cylinder, some add thereto a large rectangular box-like reservoir provided with a conical conduit or entrance (fig. 74) tapering into the box so as to preclude the possibility of the fish escaping once it has entered and found the liberty of movements it lacked while in the narrow baskets. Therein the salmon crowd in such numbers that they soon get packed as sardines in a box and finally squeeze themselves to death.*

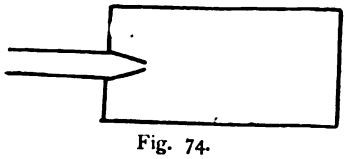


Fig. 74.

This trap is efficient at night only, and when the large terminal basket just mentioned is wanting, the nazrwət has to be watched lest the fish remaining at its mouth eventually make good their escape. At least two Indians go every morning and lift up with wooden hooks (fig. 75) such parts of the trap as cannot easily be reached by the hand and carefully empty its contents into their canoe. The Kəs are but temporarily connected, being detachable at will Two or three, or in extreme cases as many as four, are ordinarily added to the nazrwət.

Fig. 75.

The nazrwət measures at least 15 feet in length and as much as 6 or 8 feet in its greatest width,† while its narrow end is not more than 6 inches wide. Uniform with the latter is the Kəs, which is of variable length, 10 feet being probably the minimum and 16 the maximum.

Clear pieces of Douglas fir *(Pinus murrayana)* are the material chosen in the preparation of these fish traps and of all those which remain to describe. Once a suitable fir trunk has been split into portable sizes the wood is allowed to remain a few days in the water, after which it is converted with the help of the bone wedge (fig. 75 *bis*) into long and very slender rods which are then shaved smooth with the knife and assigned to their respective places in the structure. The encircling pieces are of spruce (*Abies nigra*) and are wattled to the longitudinal rods with the usual wattup or spruce root.

Fig. 75 *bis.*

* These reservoirs are called *yuta-sKai*, a contraction of *yutat-osKai*, "it (recipient) lies down stream."

† This, of course, varies with the depth of the stream.

The nazrwət and its correlative, the Kəs, are exclusively designed for the capture of the salmon. A second fishing device, less restricted in its use, is the *'kûn-tzai.** It works on the same principle as the *yutasKai* or terminal fish-box. It is a large cylindrical basket about 15 feet long and at least four in diameter. Its bottom end is made of sticks radiating from the centre, while its entrance is provided with the tapering conduit or "heart," as it is called by the natives, which we have already noticed in the *yutasKai*. Only in this case it is much longer, since the apex or inside end of the truncated cone-like aperture reaches almost to the middle of the whole basket. To make the safe keeping of the fish doubly sure, the converging sticks of this inner conduit are made to project inside beyond the small hoop to which they are fastened. These pin-like stick-ends easily dissuade the fish from trying to escape.

The 'kûntzai was formerly used in connection with beaver trapping, and to-day it does duty in several localities against the musk-rat. In such a case the lattice work is made of sticks so broad as to resemble laths more than rods, while the interstices between its component parts are so small that they leave no room for the rodent's snout should it attempt to gnaw off pieces of it. As an additional measure of safety for the trap, stones are also scattered on its bottom, upon which the game is said to direct its attention in the hope of effecting its escape. When used as a trapping implement these baskets are laid in the bed of sluggish rivers or creeks previously jammed with branches and boughs of coniferous trees.

But what we are presently concerned with is fish trapping. The 'kûntzai are used here (Stuart's Lake) in conjunction with the nazrwət. They are likewise deposited in the bed of the stream, but with their mouth or entrance end in inverse positions relatively to the direction of the current. I think that no words of mine can better explain their use and respective positions than the accompanying diagram showing both nazrwət and 'kûntzai weirs with their hurdle corrals and baskets. *A* is the 'kûntzai weir which is semicircular and extends to the middle of the stream only. For this reason, though it is built on the same principle of piles and braces as that of the nazrwət, the necessary strength is more easily obtained. Its shape precludes the possibility of being latticed as the former, yet every issue is carefully stuffed with spruce boughs. *B* and *C* alone are regular hurdles similar to those forming the corrals of the main or up stream barrier. *D* represents a partial trellis left open at the proper intervals to receive the mouth of the 'kûntzai *e*, which are laid

* Apparently a contraction of *ə'kûn-ɔstzai*, "fish-ova are lying down," which etymology is hard to explain, since those fishing implements have (*now* at least) no relation to fish ova.

down in parallel order to the number sometimes of ten or twelve. Immediately facing the row of basket entrances a large beam *F*, hewn on the upper side only, partly floats on the water and is partly supported on the forks of piles driven in the bed of the river.

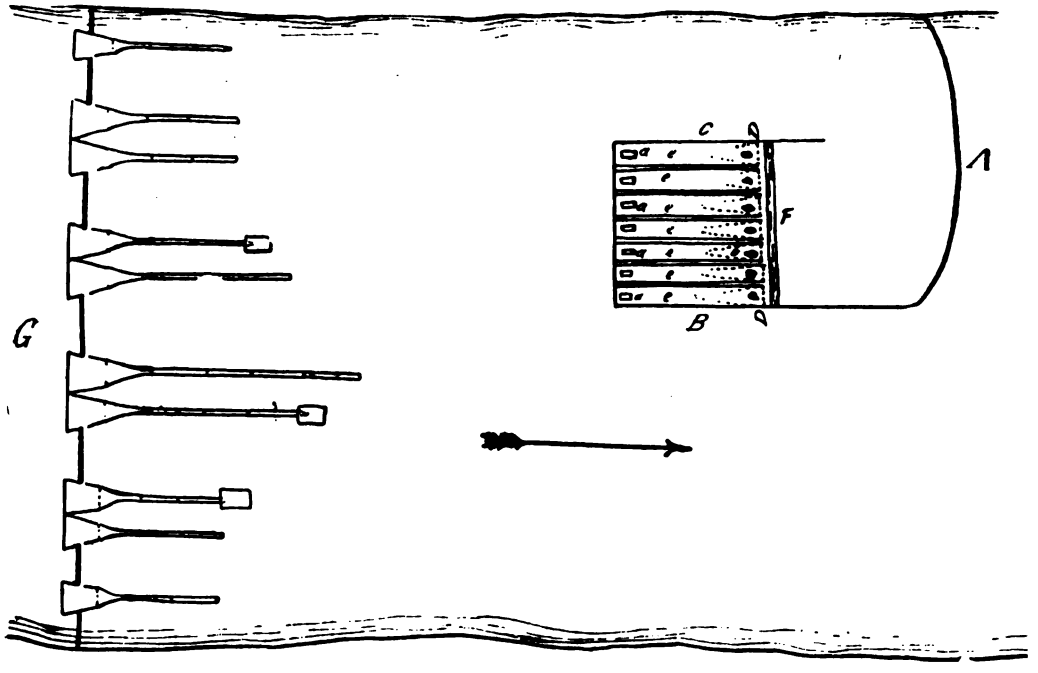


Fig. 76.

So much for the apparatus. Now as to its working. The fish, which is constantly following its way up stream finding any further progress impeded by the staking across the river *G*, remains there almost stationary during the day feeling shy of the nazrwət traps prepared for its capture at night. So it frequently happens that within the space intervening between the complete and the partial weirs large numbers of the fish have congregated ere the sun sets. Therefore natives, manning as many canoes as are available, drive it by dint of noise and by well directed strokes in the water, first into the corral *A*, *D*, *F*, and then to the cylindrical baskets wherewith it is secured. Then, at a given signal, one man from each canoe jumps on the beam *F*, and lifts up the entrance end of the baskets as a precaution against the possible egress of a few fish, while his partner returns by canoe to the opposite end of the trap to empty it of its contents. A lid or door *a* there prepared on the top side of the trap facilitates that operation. The lifting up of the 'kûntzai at the entrance extremity is the work of but a moment, inasmuch as it

chiefly results from the dropping in the water of the large stone *b*, which keeps it sunk to the proper depth.

Both the nazrwət and the 'kûntzai are serviceable in such places only as the outlet of lakes or shallow streams where the current is slow enough to permit of the erection of the necessary weir. Where this is impossible, a third and even more ingenious device—since once it is placed in position, it does all the work of itself—is resorted to. Lattice work projecting a few feet only from the shore is erected in the water, connected wherewith is laid on the bottom a tobogan-like basket with an opening near its curved end. The fish passes through this into an uncovered canal-like conduit leading into a large latticed reservoir where it is caught. The apparatus becomes more intelligible by a glance at fig. 76 wherein we have a sectional view of the whole. The lines marked

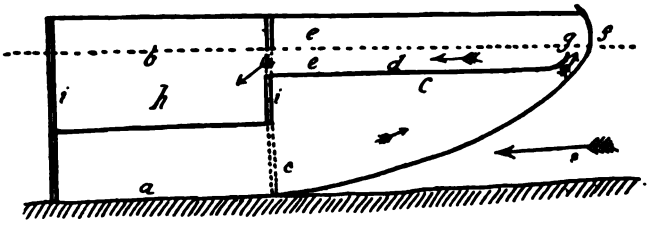


Fig. 76.

a, and *b* show respectively the bottom and the surface of the water. The upper part of the entrance basket *c* is flat and serves at the same time as a bed for the canal *d* which is formed by the addition of two long hurdles *e* on either side of the main or lower basket top. The salmon having entered at *c* soon finds its way upstream blocked at *f*, where the basket is rather narrow. But, as its instinct is decidedly against the wisdom of a backward course, as soon as it becomes aware of the free passage prepared at *g*, therein it runs and thence to the trap *h* laid out for its capture. *i* stands for one of the stakes which hold up the trap or reservoir while they secure the whole structure against the action of the current.

This fish-trap is called *ɔs*, and it does also good service against the land-locked salmon and other minor fish, such as trout, ling, etc., in such streams as are favored with a strong current.

Where the river is of a more sluggish character, a fourth device, called *we*, is resorted to. Though differently constructed, it works on the same principle as the preceding. Its use requires the building of a regular weir or staking across the entire width of the stream, and several such traps are laid out, side by side, pretty much as is done with the nazrwət.

The diagram fig. 77 gives a longitudinal section of this fishing contrivance, which, after the details furnished above, hardly needs a word of explanation. It suffices to follow the smaller arrows of the figure to understand the movements and account for the capture of the fish. Let me simply add that all the component parts of this trap are originally distinct and separate. They are merely kept in their proper place by means of willow bark wattlings.*

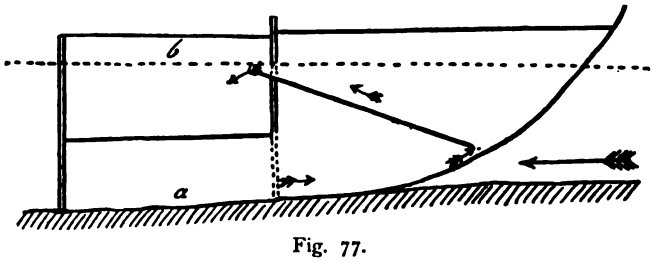


Fig. 77.

Less complicated than any of the preceding fish-traps is the *thé-sKai* (laid down on the bottom), which is also of latticed work and whose general appearance cannot be better described than by comparing it to a coffin (fig. 78). Its catching device consists of a sort of trap-door attached on the inside to the top of one end and slanting down until it almost touches the bottom of the box-like apparatus. This door is so arranged that it slightly yields up to pressure from the fish and shuts down on it once it has entered. The thés-Kai is used in shallow streams only.

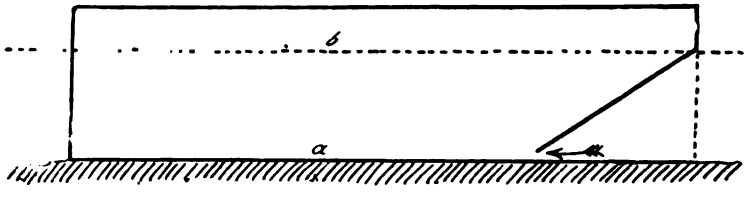


Fig. 78.

A sixth method of salmon fishing which is likewise practicable in a few localities only is that wherewith a *tə-sKai*,† or pot hanger basket has to be employed. "In some places where the stream contracts to an insignificant width and, in escaping from its rocky embankment, produces a fall deep enough to temporarily impede the salmon's course upwards,

* In the accompanying diagrams, the smaller or inner arrows show the course of the fish, while the larger ones point to the direction of the current.

† A contraction for *tə-əsKai*, "it (a recipient) stands up."

the Carriers simply bridge the fall over and with bark ropes suspend therefrom a sort of lattice, seven or eight feet wide, the lower extremity of which is curved up like a pot hanger (fig. 79). When the fish attempts to jump over the fall, he strikes the latticed barrier and drops back into the basket-like bottom."*

Fig. 79.

Lastly, where none of the above described modes of capturing the salmon are available, the Carrier or TsiɬKoh'tin has still a seventh expedient, more inconvenient and less profitable it is true, left at his disposal. This is fishing with the bag-net (fig. 152). Unless the run of salmon be exceptionally large, this method is rather tedious, and either dire necessity or the passion of a sportsman only can be adduced as an excuse for this kind of fishing, inasmuch as it is impracticable except at night. I still remember coming up some ten years ago, the mighty Fraser then swollen up to the brim by the July freshets. As we were making very poor time painfully poling up stream, I had resolved to profit by a beautiful moonlight to compensate by night boating what we necessarily lost on account of the slowness of our progress during the day. As we neared the Indian village we were making for, we frequently sighted from a distance human forms standing motionless on every available rocky promontory projecting into the river. Upon approaching them, we would perceive that they were intently gazing on one spot in the water, and when questioned as to their success, their almost invariable answer would be: *Sukrak! thallo hulɘR!* "Not a bit; there is no salmon.!" They were bag-net fishing.

Where the natural rocky projections are not pronounced enough wharf-like scaffoldings are erected for the convenience of the fishermen. Some such are to be seen on the HwotsotsənKwah which evidence no mean engineering capabilities.

In describing the Déné fishing contrivances, I have occasionally used the foot measure as the best, because the most common, means of determining their dimensions. Useless to say that this is not the recognized standard of length measure among the natives. Before proceeding further, it may not be irrelevant to enumerate their various measures.

* The Western Dénés, p. 129.

They are :—

1. *Horwə-thisni*,* the fathom, measured from end to end of the arms extended.

2. *Ne-tayo*,† the half-fathom ; from the middle of the chest to the tip of the fingers.

3. *Ne-t'sû-'kət*,‡ the smaller half-fathom ; from the breast to the extremity of the hand.

4. *Ne-kran-'kəz*,‖ the yard ; from the shoulder to the end of the fingers.

5. *Ne-t'silla*,§ the cubit ; extremity of the hand to the elbow.

6. *Ne-lla-tcən-'kəR*,** the hand-length ; the hand up to the wrist.

7. *Tîltzə*R,†† is the width of the fourfing ers slightly stretched out. It is a net-mesh measure.

8. *U-'kwə-sthan*,‡‡ the finger-width. It is obtained by laying on the object measured as many fingers pressed together as may be necessary. It is the smallest Déné measure, and is resorted to in connection with pieces of tobacco, of bread, of costly cloth, etc.

The largest and most commonly employed is the first named, *horwə-thisni*, which serves to measure houses, fish-traps, nets, logs, etc.

Another measure of length of a more complex nature is obtained by pressing one hand over the breast and reckoning from the tip of the other hand to the elbow of the folded arm. It is therefore equivalent to three-quarters of a fathom.

To preserve their salmon the Carriers and Tsi|Koh'tin have recourse to the well known method of drying. After the head has been cut off, they open and clean the fish, after which they expose it for one day or two to the rays of the sun. The spine and vertebrae are then extracted, together with the flesh adhering thereto, which is destined for the dogs' larder or used as bait when trapping. The fish is next furrowed inside with a sharp knife as a precaution against putrefaction, and, two wooden splinters having been driven through the flesh so as to keep its inside constantly opened, it is dried beneath rough sheds by the action of the sun and air aided by the fire and smoke underneath.

As for the heads, which are considered by many as the *morceau délicat* of the salmon, they are cut open and smoked or their oil is extracted in this wise : After long willow twigs have been spitted through them, they

* Lit. "along it it is embraced ;" verb. noun.
† "Man-chest."
‡ "Man-breast-on."
‖ "Man-arms-half."
§ "Man-elbow end."
** "Man-hands-stick (wrist)-after."
†† "It straddles," fourth category of nouns.
‡‡ "It-over-it (long obj.) lies," a verbal noun.

are deposited in the water on the sandy shore of the lake or stream till they reach an advanced stage of decay. The stench they then exhale is simply asphyxiating. But not so with the natives, it would seem, since they do not recoil from collecting them and, after having slightly exposed them to the action of the sun as a means of evaporating the water they have absorbed, they submit them to a thorough boiling in large bark vessels and gather their oil in bags made of salmon skin. This they greatly relish, and have recourse to whenever they wish to enhance the natural succulency of their service berries and other fruit. To a civilized palate it is simply an abomination.

LAND ANIMAL TRAPS.

While the fauna of Northern British Columbia could be more varied, it is nevertheless abundant enough to relieve the more pressing needs of the Indian tribes stationed within its borders. With one single exception all the larger mammals on whose meat the prehistoric Dénés subsisted are still to be found there. By this exception I refer to the elk (*Cervus canadensis*, Erxl.) which the Carriers assert to have been indigenous to their present territory, but which has long disappeared from among them. Philologically speaking its successor is the horse, which both Carriers and Tsiɬkoh'tin call a domestic elk (*yézih*, elk, *ɟi* dog or domestic animal), while the Tsé'kéhne see in the noble animal nothing but a "big dog" *ɟi-tco*. From an economic standpoint however, it is now replaced by the moose (*Alce americanus*, Jardine) and the cariboo (*Rangifer caribou*, Linn.)* The deer (*Cariacus virginianus leucurus*) which is unknown to the Tsé'kéhne and rare among the Carriers is exceedingly plentiful among the Tsiɬkoh'tin. But Providence has given the former two valuable mammals which are practically wanting among the latter, I mean the mountain sheep (*Ovis montana*, Cuv.) and the mountain goat (*Capra americana*, Rich.) whose native names are *təpe* and *əspai* respectively. Other animals which are sought more for their meat than their fur are the hoary marmot (*Arctomys caligatus*), the ground-hog (*A. monax*, Linn.) and last but not least the hare (*Lepus americanus*). The porcupine (*Erethizon dorsatus epixanthus*) was formerly hunted for the sake of its quills which were greatly prized as an article of ornamentation.†

Most of the other mammals hunted by our Dénés are valued chiefly for their fur, though the meat of almost all is appreciated as an addition

* The moose is called *təni*, and the caribou, *hwotzih*, by the Carriers.

† The marmot is called *tətin*; the grounp hog, *'kani*; the hare, *kəʀ* and the porcupine, *təɬ'quk*.

to their provision store. Prominent among them is of course the beaver (*Castor fiber*, Linn.), which is called *tsa* by all the Western Dené tribes. Its small congener, the muskrat (*Fiber zibethicus*, Linn.), is the beaver of the children and the poor, to whom it is known as the *tsé'két*. However a much more precious game even than the beaver is the black bear (*Ursus americanus*, Pallas), called *ɜ̄as* by both the Tsé'kéhne and the Tsi¡Koh'tin and *ɜ̄ɔs* by the Carriers. Our Western Dénés, who usually prove so cowardly against a human enemy, are so courageous when matched with almost any wild beast, that among them he would not be considered a man who would be afraid of a bear. Personal encounters wherein bruin comes out second best are by no means a rare occurrence here, and not a few Carriers still bear the marks of the bear's teeth and claws. Even the grizzly (*U. horribilis*) is no terror to them. I have here at my side an Indian who has killed one with a revolver, while I am well acquainted with another, a most reliable man, who by his fearlessness and *sangfroid* put to flight a bear of that species with which he had been sitting face to face for perhaps a quarter of an hour without receiving as much as a scratch from the monster, and without having used the shotgun which he had not had time to load. The main point in such awkward circumstances is not to betray the least fear and to look one's adversary right in the eyes. Show any degree of hesitation and you are lost. Although no two species of the grizzly bear are known to science, it might be, however, that the *shyas*, the bear of which I am speaking, is but a variety of *Ursus horribilis*, inasmuch as the Indians pretend to know another and much more formidable one which they call *tsa-rana* or "he busies himself with the beaver," by allusion to its favorite occupation, beaver hunting. This animal they fear, and so far they profess never to have killed any adult of the species, but to have occasionally seen a few. It is, they say, much larger than the *shyas* or common grizzly; its heel is proportionately narrower and the fore end of its paw much broader. It is worthless as an economic item, as it emits a most offensive smell.

The other fur bearing animals sought after by the Western Dénés are the marten (*Mustela martes*, Rich.), the fisher (*Mustela canadensis*, Linn.), which the Carriers call a "big marten," *tɔnnih-tco*, the otter (*Lutra canadensis*, Turton), the wolverine (*Gulo luscus*, Linn.), the lynx (*Felis canadensis*, Rich.), the fox (*Vulpes vulgaris*), the wolf (*Canis lupus occidentalis*), the coyote (*Canis latrans*), and the two small carnivores, the ermine (*Putorius vulgaris*, Linn.), and the mink (*P. vison*, Brisson). In addition to *washi*, its regular name, the lynx, whose ancestors are believed to have had intercourse with women, is often half jocosely called *sûnté*, "my first cousin" by the Carriers. As to the different

varieties of foxes and wolves, they are recognized and differentiated by adjectives, not distinct names, in the native tongues, as they are founded merely on colour, not, as with the dog, on anatomical peculiarities. It is a well known fact among our aborigines that, for instance, red, cross and black foxes are found in one and the same litter, so that it seems naturalists should not see more difference between a red and a black fox than they do between a gray and a white bull-dog.*

When not chased or killed by chance as happens in the course of one's travellings, the above named fur bearing animals are procured either with

Fig. 80.

traps or snares. At least three varieties of the former contrivances, all of genuine Déné origin, are still in general use, and a fourth, the bear

* It should be mentioned here that aboriginal usage prevents the hunter from killing for himself any of the largest animals, especially such as are chased for their meat. After his game has been brought down, he will invariably give it to one of his companions, or if he happens to have none, he will cache it up against wolverines or any carnivorous animals and return to the village. Then he will say to any one whom he chooses to favour with his spoils: "In such and such a spot in the forest I have shot a cariboo for you. Go and fetch it." To act otherwise would be equivalent to courting the scorn of every hunter of any standing in one's place.

trap, though now a thing of the past, is still remembered by old men. Its main or fall part consisted of trunks of small trees united into a sort of lattice work by means of muskeg pine saplings interlaced through them. To ensure additional efficiency for the structure, large stones were laid over it, heaps of which are still to be seen in several places, generally close by the banks of salmon streams. I can find no native in a position to satisfactorily explain the mechanism of this trap. All I can gather is that it was very effective, not only against black bears, but even against grizzlies.

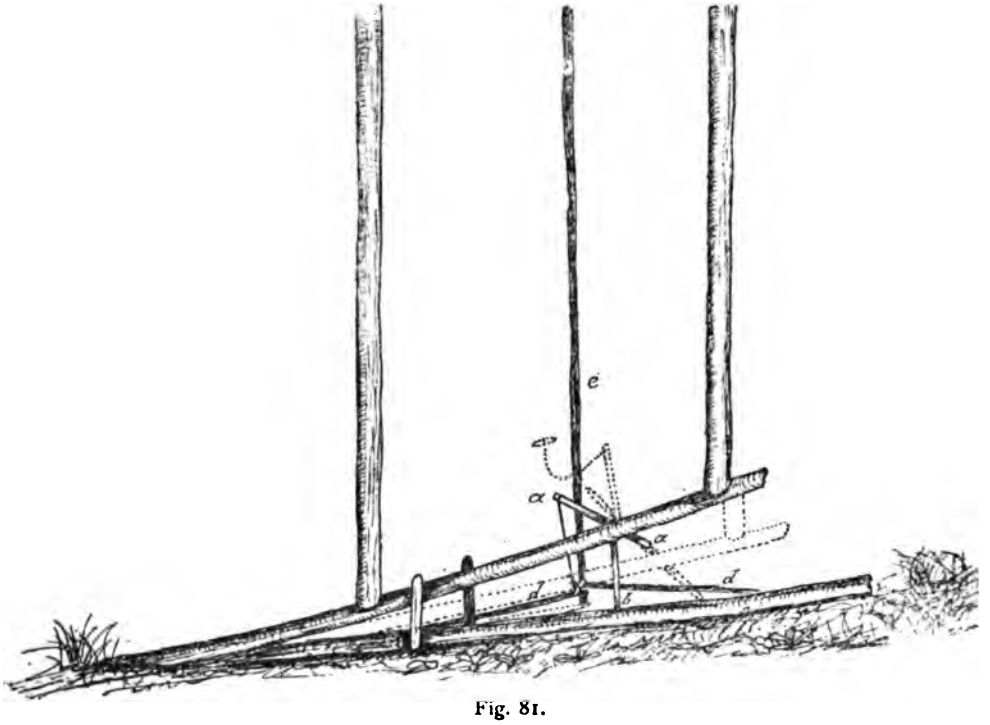


Fig. 81.

To secure martens and other small land game, the Carriers never use but the trap shown in fig. 80, which is very simple in construction. It is merely composed of a fall stick *a*, one end of which is thrust in the ground in an oblique direction, and which springs down on the transversal or ground stick *b*, through the falling off of the pole *c*, resting upright on the bait stick *d*. To prevent the game from getting at the bait otherwise than through the trap, a rectangular enclosure is erected with small pickets generally against, or close to, the bole of a spruce or pine tree. Should the fall stick not exactly correspond in position with that lying on the ground, the marten might survive the springing of the trap and

eventually effect its escape. To guard against such an accident, two stakes *e* are driven in the ground on each side of the falling apparatus. The use and working of the weight pole *f* need no explanation.

Much more complicated, as may be seen from fig. 81, is the action of the lynx trap. The device causing the capture, if not the death, of the game, is identical with that of the preceding, save that two weight poles instead of one are used. But the principle of the apparatus itself is altogether different, and might be pointed out as an evidence of no mean ingenuity. Although I have faithfully outlined in dots the working of the trap while in the act of springing, some further explanation of it may be necessary.

The general principle governing its action is the balance principle. The fall stick being pressed down by the weight sticks, thereby forces up the furthest end of the lever *a*, which is balanced on the post *b*, acting as fulcrum. As an immediate consequence, the string button *c* (fig 82) is started up and at once arrested in its flight by the horizontal sticks *d* engaged between the button and the perpendicular pole *e*. The reason of the springing of the trap is now easy to understand. The lynx, or fox, upon trying to get at the bait laid on the ground a little distance off within a picket enclosure, is bound to tread on the trip stick *e* which is thereby disengaged from the pressure of the button, which immediatcly whirls up yielding to the action of the weight poles on the lever, as shown in the dotted outlines. Both the post and the perpendicular pole *e* are stuck in the ground, and the latter, as well as the weight sticks, are set up through the branches of the tree under which the trap is prepared.

Fig. 82.

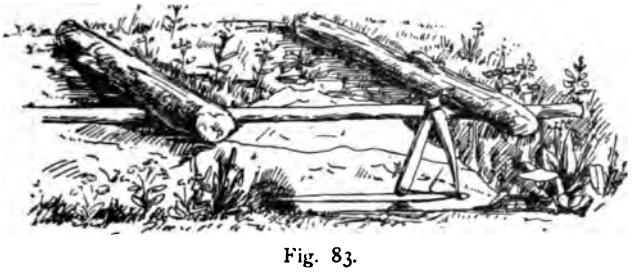


Fig. 83.

A somewhat different setting of the same trap is obtained by engaging the trip stick *above*, instead of *below*, the middle of the button piece. In this case no bait is provided for the game, but the trip stick is thoroughly rubbed over with castoreum, by licking which the animal springs off the lever, whereby the fall stick slips down on the base.

A modification of this trap is occasionally used by a few to capture the beaver. But as the Crees are credited with its invention, no further mention of it is necessary.

Fig. 83 represents a kind of trap differing in every particular from the three already described. It is proper to the Tsé'kéhne and does service against marmots. As shown in the cut, it is usually set in front of the animal's den, and its action or working apparatus has some resemblance to the common figure four trap. Its trip stick *a* is laid across the entrance of the marmot's den and is disposed so as to form a right angle with the left side of the spring stick *b*. Of course this is concealed from view with dry grass, leaves, moss or any other available vegetable material. In order to give even a clearer idea of the mechanism of the trap, its com-

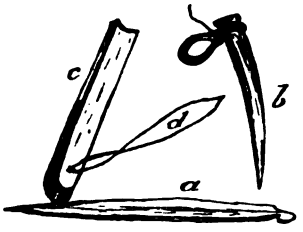


Fig. 84.

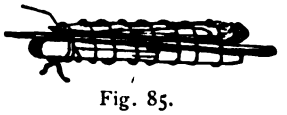


Fig. 85.

ponent parts will be found separately drawn in fig. 84. Let it suffice ot add that, while the fall stick is looped to the springing piece *b*, the small end of the latter is at the same time notched in the trip stick *a* and connected with the post *c* through the double string *d*, which presses in the extremity of both trip and spring pieces.

These traps are not hastily constructed on the spur of the moment with any chance material taken at random from the immediate vicinity of the spot where they are set. They require some little care in their preparation, and they are therefore made at home, and carried about with their different parts tied together as shown in fig. 85.

SNARES.

Whilst we are occupied with the divers contrivances invented by native ingenuity to capture land animals, it may be well to give some idea of the Western Dénés' methods of snaring the same. To such as may be tempted to call in question the appositeness of such minute details, I would beg to point out that the aborigines, whose technology we are studying, are pre-eminently huntsmen no less than fishermen; and to call complete a review of their industrial implements, which does not

embrace their various fishing and hunting contrivances, would be equivatent to supposing well constituted a body lacking nerve or bone. Besides giving us some idea of their proficiency as craftsmen, they enable us to witness, as it were, the workings of their mind as applied to their means of providing for the necessaries of life. So that those very details which may appear unimportant to the superficial reader, add in the estimation of the scientist, a psychological interest to a study which is primarily technological. What has already been said of the Western Dénés' fish or animal traps has led us to the conclusion that, if those aborigines are wanting in the appreciation of the beautiful, they are by no means devoid of the faculty of judging and selecting that which is best suited to the attainment of their ends. A review of their snaring devices cannot fail to confirm this impression.

At least eight different methods of snare setting, generally varying according to the nature of the game, obtain among the single Carrier tribe. I leave it to the following figures to explain the details, and shall content myself with noting *en passant* that which they cannot tell.

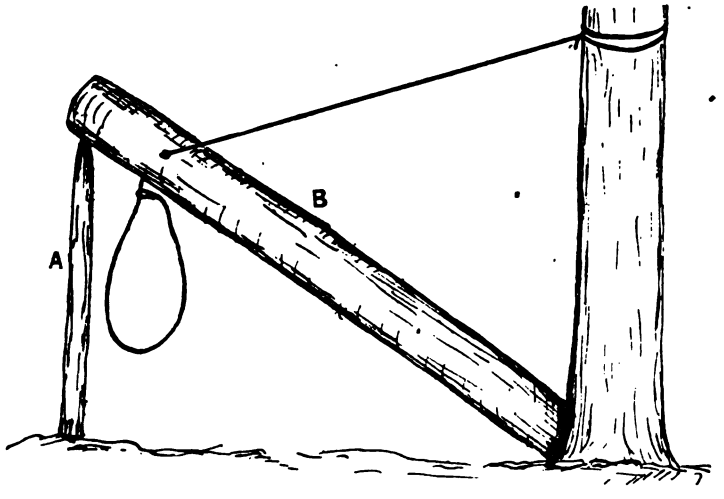


Fig. 86.

Figs. 86 and 87 represent bear-snares * whereby the game is either choked down on the ground (fig. 86) or flung up in the air (fig. 87). The action of the former is exceedingly simple, though it cannot fail to prove very effective. Of course it is clear that the bear upon getting engaged in the noose, which is in all cases held in the proper position through

* The root for snare in general is *pi*, and this word is suffixed to the name of the game for which each snare is intended. Euphony demands that it be preceded by an *m* ; therefore bear-snare is *ɔ̀ɔs-mpi* ; lynx-snare, *washi-mpi*, etc., in Carrier.

small strings lashed to the bushes near by, will, to free himself therefrom, pull forward or backward. Either movement must result in the fall of the post *a* and thereby of the beam *b*.

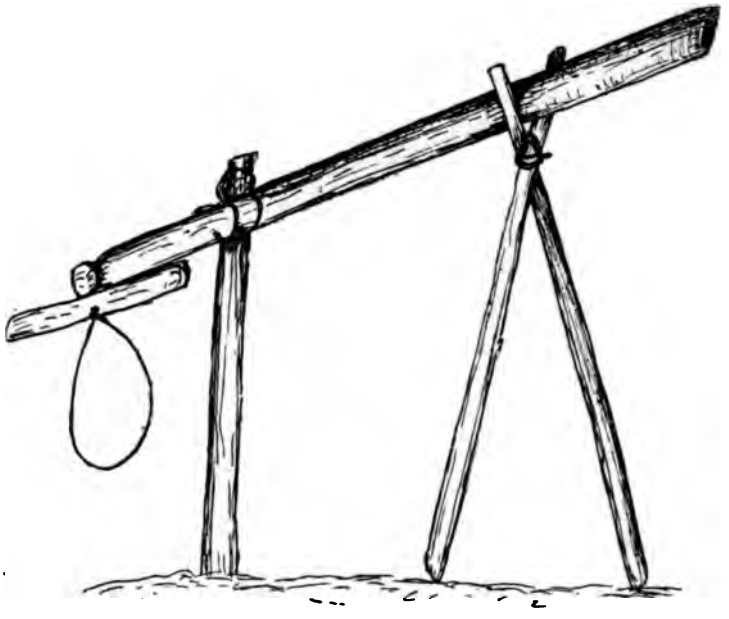


Fig. 87.

As to the second mode of setting the bear-snare, it may be necessary to explain that as soon as the game is noosed up by the falling of the crossed poles, he will naturally, in his efforts to disentangle himself, struggle for a support for his paws so as to annul the action of the noose. This is provided for hi.n in the shape of the wooden piece noticeable under the small end of the lever. But as the role of the hunter is not one of mercy, he has taken care, prior to setting his snare, to bore through that piece of wood a hole large enough to ensure its slipping down with the contraction of the noose. So that by pressing down on it, the animal only hastens its own death. The manner of lashing the lever or balancing pole to the post is shown in Fig. 88. It is reputed the safest and is adopted with regard to all other snares requiring a similar appliance.

The setting of the cariboo snare cannot be simpler. As shown herewith, it merely consists in a noose attached to a stout stake (fig. 89) with which the game scampers away, and becoming engaged among fallen or standing trees chokes himself to death.

Until a few years ago, the Tsé'kéhne were wont to use these snares extensively and with no mean results. As many as forty or fifty were

set in a line through such defiles or passes of their mountains as were the most frequented by the roaming bands of cariboo. After two of their most active hunters had been deputed to watch at either end of the line, the others, numbering fifteen or more, would, by loud shouting and firing of guns, drive the reluctant game to the snares where it was captured.

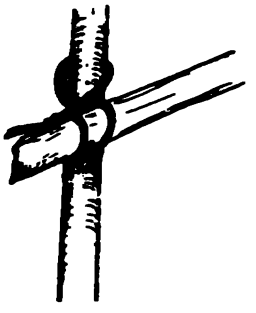


Fig. 88

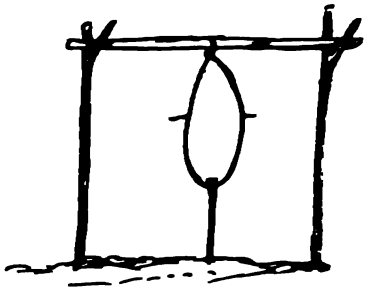


Fig. 90.

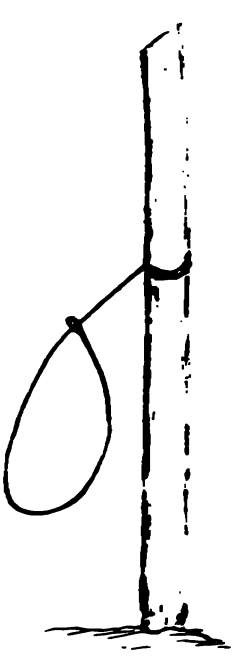


Fig. 89.

In figs. 90 and 91 we have snares very differently set though they are intended for the same kind of game viz: the lynx. The working of the apparatus is in the first model identical with that of the cariboo snare. The little stick planted in the ground is destined to no other purpose than that of holding the noose in position with the help of the thong or strings.

Fig. 91 though more complicated in appearance is the less easy of understanding. It is composed of two levers balanced on the post, the end of the main or snare pole being weighted under that of the other, which is prevented from pressing on the weight of the snare by the temporary stick set therefor. The struggle of the lynx when caught in the noose will cause this to drop off on the ground

whereby the small end of both levers will spring up, leaving no possible chance of escape to the game.

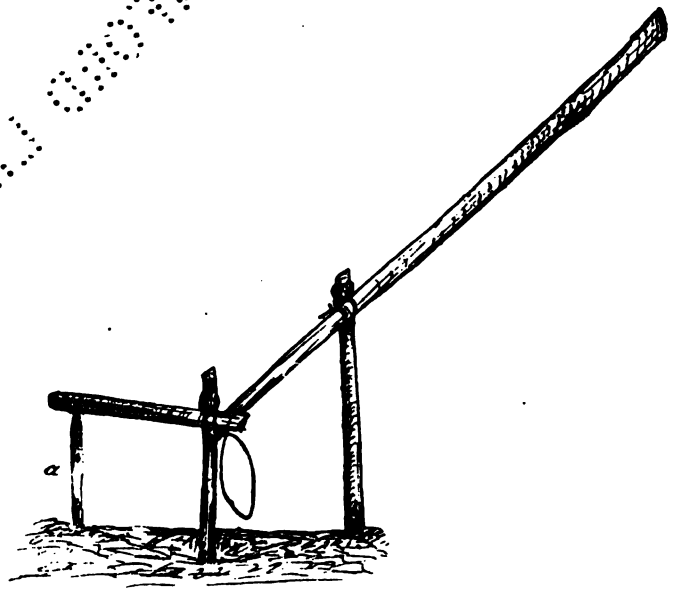


Fig. 91.

The fox snare (fig. 92) is likewise based on the balance principle, and needs no further explanation than this: The snare string above the noose

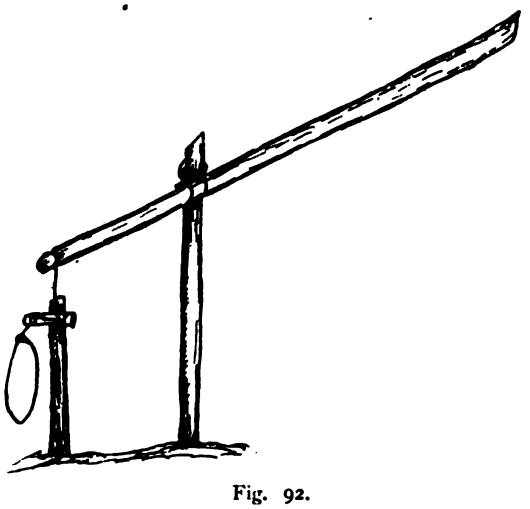


Fig. 92.

is wound round a stake solidly driven in the ground and a detachable transversal piece of wood in such a way that it unrols itself by the

slightest movement on the part of the noosed animal. This connection between the transversal and the horizontal sticks I have tried to illustrate

Fig. 93.

by fig. 93; but I think that its working requires to be seen to be fully understood. This snare does also good service against marmots.

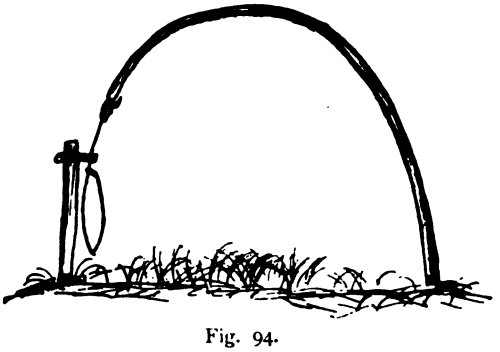


Fig. 94.

Fig. 94 represents a mode of snare setting usual in connection with the latter game only. It needs no explanation, since the lever of fig. 92 is simply replaced here by a bent down switch.

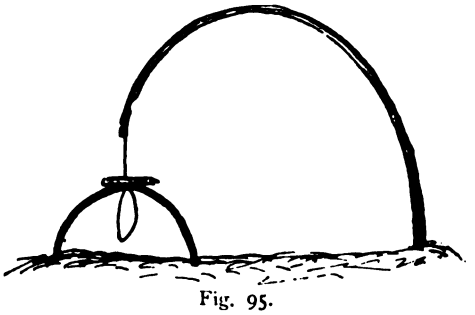


Fig. 95.

Lastly fig. 95 gives us an idea of the rabbit snare as it is commonly

set by our Carriers. The method is identical with the preceding, save that a switch forming a semi-circle is substituted for the stake to which the movable cross-piece is temporarily fastened. Of course this necessitates a change in the position of the latter which in this case is laid horizontally over the apex of the hoop.

The strings of the cariboo and bear snares are made of moose or cariboo skin strands, generally four in number. As a protection against moisture or any other deteriorating agent, they are in most cases wrapped with thin strips of willow bark. Hempen twine such as is for sale at any H. B. Co. fort nowadays serves against any species of minor game.

Before leaving this subject, it may not be amiss to mention that even waterfowl were formerly sought after by means of snaring devices. Ducks and grebes were then the coveted game. The snares consisted in a noose cord of vegetable fibre attached to a stick firmly driven in the bottom of the piece of water, more generally in such shallow places as the fowl ordinarily frequent when feeding.

Waterfowl of any larger species such as geese and swans, especially the latter, are said to have been secured in olden times, by an ingenious stratagem which cannot be better described than by relating the following fragment of the Carriers' national legend wherein the famous hero ʒstas plays such a wonderful role.

"In the course of his travellings, ʒstas came upon a family consisting of the father, two sons and a daughter. One day, the old man sent his sons to try their chances at catching swans in his hereditary fishing-place. The young men, who had already heard of ʒstas' wonderful deeds, said to him: 'Cousin, we always lose our time in our attempts at catching swans. Our father wants some to make for himself a head-dress and a breast blanket* for the winter. People say that you generally succeed in any enterprise you undertake. Come then, and help us.' ʒstas readily consented, and went out with them.

"When they had reached the family fishing grounds, they perceived eight swans lazily gliding on the water. 'Have not you taken a rope along with you?' asked ʒstas. Upon which they pointed to a long rope which had been left there for future use in a similar emergency.

"Presently ʒstas donned a head-dress made of the head and neck of a swan, and, taking the rope with him, swam slowly towards the swans imitating in every point their movements. Then he deftly tied the feet

* See the chapter on Dress and Personal adornment.

of five of them to his long rope without as much as awakening their suspicions, and swam back to the stake driven in the bed of the river to which he secured the end of his rope. Being now sure of his game, he took off his head-dress when the swans perceiving their mistake took to their wings, but were soon arrested in their flight by the retaining rope and stake. They were then taken by the wily stranger.

"The young men who had on previous occasions tried the same trick without avail, were delighted at the success of their guest, so much the more that nobody before him had been able to get by this method more than four swans at one time. They therefore invited him on another day to give them a further proof of his ability, and even to outdo himself if that was possible. Much flattered at their encomiums, ʒstas this time tied the legs of no less than eight swans. But as he was swimming back to attach the rope to the stake, he unwittingly lifted off his head-dress, upon which all the fowl flew off taking up with them ʒstas who was thus carried very far away into the countries beyond the horizon."

The story then proceeds to relate how, new Vulcan, having let go the rope, he fell down upon a rock wherein he sank and was buried alive.

Whether this or any analogous mode of securing waterfowl was really practised by the prehistoric Carriers cannot, of course, be now positively stated. Strange as it appears, some such stratagem may have been resorted to, since we read that in China waterfowl are caught by wading in the water up to the neck with one's head hidden in a gourd and then seizing the bird's legs to finally draw it down in the water without ever revealing one's personality.* Be that as it may, the modern Carriers know it only by tradition. They now prefer to build small circular huts of coniferous boughs or even walls or cairns of stone in the favorite haunts of the fowl behind which they hide and by imitating their call, prevail upon them to approach within shooting range when they are easily dispatched.

I have enumerated the fishes and land animals trapped or otherwise hunted by our Western Dénés, and described the various devices made use of to secure them. I leave it to the following list of the names of the lunar months in two dialects to furnish the reader with some hints as to the time when they are generally sought after.

---

* See *Six Legendes Américaines identifiées à l'histoire de Moise, etc., par le R. P. Petitot, Missions de la Congrégation O.M.I.*, Paris, 1877, p. 741.

NAMES OF THE TWELVE LUNAR MONTHS.

IN CARRIER.	IN TSÉ'KÉHNE.
Sa-tco, the big moon.	*Int'sih-sa*, moon of the wind.
*Tcəz-səl.**	*Yastəse-sa*, moon of the snow-storms.
*Tcəz-tco.**	*Ahta-ĥnza*, moon of the golden eagle.
Cin-uza, moon of the spring.	*Ratqé-ĥnza*, moon of the wild goose.
Təkus-uza, moon of the carp.	*S̄as-inza*, moon of the black bear
Tañr-uza, moon of the summer.	*Mənəh-tcé-thə'oɟe*, moon when they‡ take to the water.
Kɬ'səl-uza, moon of the land-locked salmon.	*Hə'ke-ta*, "the buffalo ruts."
Thallo-za, moon of the red salmon.	*ʒ̄tsiz-ĥnza*, moulting moon.
Pît-uza, moon of the bull-trout.	*Sa-tsətle*, little moon.
ʔoh-uza, moon of the white-fish.	*Sa-tcî*, great moon.
Panrən nət'səKei, "during its half one navigates."†	*ʒ̄'ka'î*, "the fat (of the animals) disappears."
Sa-tco-dîn'ai, "next to the big moon."	*Mə-thən-thən-tsətle*, "what freezes is covered with bare ice."

The first of these months corresponds nearly to January.

The size of the page prevents me from giving side by side with the above the names of the Tsi|Koh'tin months. Their main peculiarities may be thus resumed: March is the "moon when one comes out of the subterranean huts"; April is the moon of the sucker; July, that of the *Kes*, or white-fleshed salmon; August, that of the red-fleshed salmon; November is called "this month we all enter the subterranean huts," and December is the moon of the ice. It will thus be seen that different social habits and occupations have left their impress even on the names of the months such as recognized by the three Déné tribes under study.

OBSERVANCES OF THE HUNTER AND THE TRAPPER.

Prior to their embracing Christianity, the Western Dénés had recourse to various other means of ensuring success while engaged in hunting. Several superstitious practices were observed, the neglect of which was

* The root *Tcəz* is now meaningless. The finals *səl* and *tco* mean "small" and "big" respectively.

† I. e. Lake Stuart is opened to navigation during the half of this month.

‡ I. e. The goslings.

regarded as entailing unavoidable failure. Most of these were based on their regard for continence and their excessive repugnance for, and dread of, menstruating women.

As soon as a Carrier had made up his mind to try his chances at bear-snaring, he separated *a thoro* for a full month previous to the setting of his snares. During all that time, he could not drink from the same vessel as his wife, but had to use a special birch bark drinking cup. The second half of the penitential month was employed in preparing his snares. The omission of these observances was believed to cause the escape of the game after it had been snared. To further allure it into the snares he was making, the hunter used to eat the root of a species of heracleum (*tsél'ép* in Carrier) of which the black bear is said to be especially fond. Sometimes he would chew and squirt it up with water exclaiming at the same time: *Nyûstluh!* may I snare you!

Once a bear, or indeed any animal, had been secured, it was never allowed to pass a night in its entirety, but must have some limb, hind or fore paws, cut off, as a means of pacifying its fellows irritated by its killing.

Speaking of the meat of snared animals, I cannot help remarking that young women having their menses could not eat of their head, heart or hind part without exposing themselves to a premature death through a kind of rabies which was sure to attack them in after years. This infirmity led them to keep tearing off the flesh of their arms with their teeth. If perchance they were favored with a lucid moment, they improved it by making their confession to the shaman. "When young, I ate of the head, etc., of an animal" they would say. Thereupon the medicine man would suck from the body of the patient what was represented as the tabooed morsel unlawfully swallowed, and forsooth the woman was cured!

The heart even of water-fowls was forbidden to similarly circumstanced young women, who had also to abstain from cutting up the grebes which, among the Carriers, are caught each spring in such large numbers. These fowl are full of blood, and their being manipulated by such persons would communicate to the latter either hæmorrhage or unnaturally prolonged menses.

If in the woods with his wife, the hunter would also prefer to see her tear herself up in the bush and thorns, to let her pass in the narrow trail wherein he may have deposited his snares preparatory to setting them. Should she as much as step over without touching them, her mate would certainly consider any further attempt at capturing game as futile and useless.

The skulls of the bears whose flesh has been eaten up are even to-day invariably stuck up a stick or the broken branch of a tree. But the aborigines fail to give any reason for this practice.

If the Carrier was to use traps instead of snares, the observances preparatory to setting them varied somewhat. When martens were the intended game, the period of abstinence from sexual intercourse was shortened to ten days or thereabouts, during which the trapper slept by the fireside pressing down a little stick over his neck. This, of course, could not fail to cause the fall-stick of his traps to drop on the neck of the coveted game! The chewing and squirting up of the heracleum root were observed in this as in the former case. The deprecatory formula was merely changed into *Nyûskuh!* may I entrap you!

When successful, the trapper had to be very careful that no dog touches his prey, which, to avert such a misfortune, he had to hang up a peg in the lodge as soon as this was practicable. Contact with a dog would certainly indispose the game's fellow martens against the traps of the hunter responsible for such a slight.

No superstitious practice appears to have been followed as a preparation to beaver hunting, save that to ensure a larger catch, one-half of each trap was daubed with red ochre. But nobody who does not care to condemn himself to useless efforts at securing any further supply of the game must be unguarded enough to swallow the little patella bone of the beaver. In like manner, if after having captured a beaver, a Carrier has the carelessness to let one of his dogs get at that bone, he may as well resign himself to return home empty handed. During the whole beaver-trapping season, his first capture will infallibly be his last.

Lynx not only was not eaten by the women, but even when once snared, it could not be brought in the lodge through the doorway. Women as well as men daily enter through that passage, and the former must have no intercourse, however indirect, with the feline. So it was introduced by men into the lodge through the smoke hole in the roof. It was touched by men only, its flesh boiled by men and eaten by men. The reason of the aversion of the women for the lynx will appear from the following legend:—

"A young couple of Indians was living in the woods. One morning, as the husband was absent chasing large animals, a stranger of surprising beauty and apparently endowed with superhuman powers came upon the young woman. "Follow me: you shall be my wife," he said to her. But as she was very much attached to her husband, she strove hard not to hearken to him. Yet such were the stranger's charms and hidden powers

that her mind was as if paralyzed in his presence. As she pretended that she had no provisions for the journey, he told her that the distance was short, and that he had plenty in his own place. Whereupon he seized her and she had to follow him. Now the stranger was no other than the lynx. She managed however to snatch from her lodge in leaving a grouse (*Dendragapus franklinii*, Dougl.) which her husband had shot a while before. As she walked behind her seducer, she would pluck a few of the grouse's feathers and down and drop them along thereby marking her trail on the ground. By the time that she reached her new home, the bird was entirely stripped of its feathers and down.

"The lynx's lodge was full of pieces of the fat of cariboo and moose hanging up to dry. Before dark, he went out to do a little hunting a short distance off.

"Meanwhile the young woman's lawful husband who had experienced no difficulty in tracking her, thanks to the fallen feathers and the trampled herbage—for it was summer time—came upon her as she was sitting lonely in the lynx's lodge. She at once told him the story of her abduction by the stranger. At the same time she insisted that the latter was uncommonly powerful, and cautioned her husband against using violence in this case. "We had better try and take him by stratagem, for both of us together are nothing to him," she said.

"She had barely uttered these words, when the lynx came home after a successful hunt. The woman went out to him and said presenting the new comer: "Husband, here is your brother-in-law, for he is indeed my own younger brother." Upon which the lynx asked: "Have I then a brother-in-law?"—"Yes indeed, and a very good one," answered the woman. Then her own lawful husband told the lynx how very pleased he was to see his sister married to so good a hunter and thereby delivered from her first husband who had been living with her against the wishes of all her relations. To confirm the sincerity of his declarations, he presented the lynx with his own quiver full of arrows, keeping only his bow for himself. "I will hereafter see you more than once," he added "and each time I shall make you similar presents."

"The lynx was so pleased that he insisted upon preparing himself his guest's supper.

"Now prior to his return home, the young woman had related to her real husband how the lynx had asked her whether she was having her menses. Lest she may have been tempted to prove unfaithful, she had answered affirmatively, though that was not the case. Hearing this, the lynx had manifested a great dread of her and left her untouched. They

had then, her husband and herself, agreed as to the plan to follow to effect her deliverance.

"Therefore, after they had eaten to their content, she purposely attempted to play with the lynx, while her husband, who was lying on the opposite side of the fireplace, feigned sleep. But each time that she tried to touch the lynx she was sharply rebuked: '*Skranthahoñkrés*,* you will throw a spell over my arms,' he would say. Yet she would not desist in her endeavors to keep him awake so as to render his sleep more profound once he would fall asleep.

"At length after he had been a while soundly sleeping, she motioned her husband with a stick that now was the time to act. Therefore he cautiously seized his bow which was double pointed, as one end of it was provided with a long horn dart while the other had a stone spear head. With all his might, he sank the horn dart into the lynx's breast, while his wife chopped off his head with a stone adze she had kept concealed in her bosom.

"After he had transpierced him with the horn dart, he and his wife turned him over and he repeated the same operation on his back with the stone spear head of his bow. They did not leave him till he had been reduced to a shapeless mass of bone and flesh.

"Ever since, our women have been afraid of the lynx, for he is indeed a ravisher."

In the estimation of the Carriers of the generations gone by, fishing was not fraught with the same perils as hunting, and therefore few, if any, superstitious precautions accompanied it. Indeed the only vain observance which can be mentioned in this connection was that which forbade women having their monthly flow to cut or carve salmon, inasmuch as this was reputed to seriously endanger the health and especially enfeeble for life the arms of the transgressor.

When no shaman was at hand to consult about the quantity of the salmon coming up, either the elements or some peculiarities in the vegetable kingdom afforded them a means of prognosticating the nature of the forthcoming run of fish. Thus a continually rumbling thunder or the early fall of the service-berries portended to them an abundant harvest. I would not affirm that these ideas have no longer any hold on the mind of a few modern Carriers. Those persons who are *au fait* with the popular notions current among the lower classes of the Old World will, I think, hesitate before tasking my Indians with uncommon credulity.

* *Thahoñkrés* is hard to translate in English. The lynx means that her touch while in her unclean state will incapacitate him for the chase.

CHAPTER VI.

WOODEN IMPLEMENTS.

I may mention as having some relation to one of the objects of the preceding Chapter, namely fishing, the *kwot'sɔz** and the *talləɣ*.† The former

Fig. 96.

is the wooden maul which serves to drive home the piles of the salmon weirs used by the Carriers. It is bottle-shaped, and of the hardest wood obtainable, generally birch (*Bitula papyracea*).

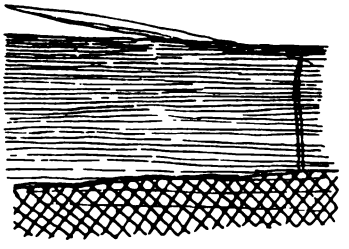


Fig. 97.

The latter is the wooden float attached to their nets. Here we cannot fail to remark that the Western Dénés had in this connection an opportunity of exhibiting at least a minimum of artistic taste, and, as in most cases, did not improve it. The cut (fig. 97) shows the working of the float when in actual use.

Such entirely wooden implements as are unconnected with either fishing or hunting are relatively few and unimportant. Therefore we need not tarry long in their description. Commencing with those which serve recreative purposes, we may refer in the first place to the *tətquh* (fig. 98) of which mention has already been made in the course of a

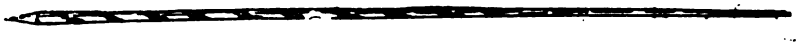


Fig. 98.

* Second category of nouns.

† A verbal noun almost equivalent to "it floats up."

native legend. It is a rod five or six feet long which is thrown through the air so as to fall as far as possible from the initial point of launching, the distance reached determining the measure of success attained. This game was formerly much in vogue among the Carriers. It is now obsolescent.

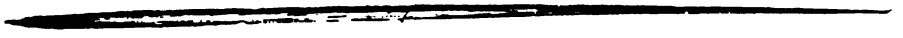


Fig. 99.

A great rival is *nəzəz*, which is played with sticks of almost the same shape, (fig. 99) though much stouter near their fore-end. As they do duty on the frozen surface of the snow, the finest polish possible is aimed at in their preparation. These sticks vary in length from three to six or seven feet, according to the strength, possessed or assumed, of the player. The Carriers are to-day passionately fond of this game, which is played, as a rule, by adverse bands, the stake going over to the party which first attains the fixed number of points.

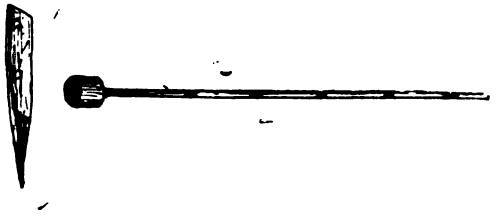


Fig. 100.

Tə'ko· is another pastime which is somewhat childish in character. In most cases it is played by the fireside in the camp lodge during the long winter evenings. Its necessary accompaniments are a blunt-headed stick (fig. 100) and two small, thin and springy boards firmly driven in the ground, one close by each player. The two opposite parties sit facing each other and throw the tə'ko· against the little board on the other side, upon hitting which it rebounds to the knees of the successful player, who is then entitled to recommence and continue as long as luck favors him. Failing to get at the mark, the tə'ko· is handed to the other partner. The number of points obtained indicates the winner. The old men profess to be ignorant of that game, which is probably adventitious among our Indians.

While we are treating of the games in connection wherewith success depends on the skill of the performer, not on mere hazard as with nət'sə·a, atlih and atiyéh, we may mention *'kɛɪ-la-pəs* ("encircling willow") or arrow target shooting, though the implement required for its performance

and from which the name of the game is derived would, considered in itself, be classed among the objects which shall form the subject matter of our next chapter.

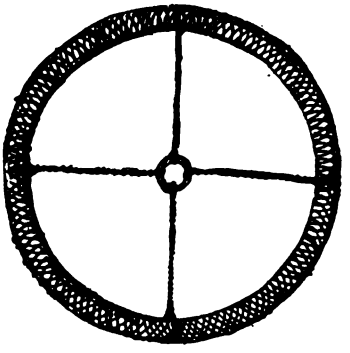


Fig. 101.

This is a sort of open work disk or wheel made principally of willow bark strings, though the frame of the hoop is composed of three or four switches very closely fitting each other and kept in position by a strong lacing of strips of bark. Radiating from the axis, or heart as it is called, are four cords of similar material stretched so as to form a cross (fig. 101).

As this was formerly the great national game of the Carriers, I may be pardoned for giving its rules somewhat in full.

A team of five or six men was matched against another of presumed equal force, and after each player had been provided with a given number of pointless arrows, the disk was set wheeling away by one team to the cry of *tlép! tlép!* This was the signal for the other to shoot at it while it was in motion. Should they fail to hit it, it was returned rolling to the first team so as to give them an equal chance of making at it with their arrows. As soon as the disk had been shot, the real competitive game commenced. The arrows which had hit it, two, three or more, became the stake for the rival team to win over. For this purpose the disk was hung up a short stick planted in the ground near the team who had succeeded in sending home the arrows, and it was aimed at successively by each member of the opposite party. Should any one be lucky enough to shoot it with his first arrow, the stake played for became his irrevocable property. When the target was hit, but on a subsequent attempt of the marksman, the stake was thereby won over, subject to its being redeemed by any member of the opposing team performing the same feat. In this case the game became a draw; the wheel was set rolling anew, and the nature of the stake was determined as in the first instance.

I have never seen 'keilapəs played by others than children and young men. But in times past it had a sort of national importance, inasmuch as teams from distant villages were wont to assemble in certain localities more favorable to its performance in good style. Indeed, until a few years ago the sporting field of some was literally dotted with small cavities resulting from the fall of the arrows.

Fig. 102 represents the device doing duty among the Tsi|Koh'tin as a spindle. Prior to the introduction of European textile fabrics, its uses were doubtless of a much wider description than to-day. As a matter of fact, I have never seen it in actual use except to spin or twist the rabbit skin lines entering into the manufacture of blankets. The discoidal attachment is wanting in the implement such as known among the Carriers.

Fig. 102.

There can be imagined no simpler or more primitive method of lighting fire than that originally obtaining among the Western Dénés. Instead of the somewhat elaborate fire-drill in use amongst the northernmost congenerous tribes, such as the Loucheux and the Hares, our aborigines' apparatus was reduced to a short stick, generally of resinous scrub pine *(P. contorta)* set revolving on touchwood by immediate contact with the hands as is practised by the Wataweita of eastern equatorial Africa.*

Shall I speak of the Western Dénés' canoes? They certainly possess no peculiarity to render them worthy of any mention, unless it be their very rudeness of form and finish. Of course I do not here refer to the birch bark canoes, which among the Carriers and the Tsi|Koh'tin, have gone out of use since the last fifty years or so. Of these I have seen but very few examples, and they were not representatives of their class.

Fig. 103.

West of the Rocky Mountains, the present Déné canoe is dug out of balsam poplar trees (*Populus balsamifera*), and either because the material will not admit of a similar treatment, or because our Indians have not yet learned the method of expanding the sides by the action of fire underneath, as is done by the Coast Tribes with regard to their cedar canoes, they are left almost as narrow at the centre as the tree was while in its

* See "Fire making apparatus in the U.S. Museum," by Walter Hough, p. 553.

original state. A few cross sticks only prevent the sides from shrinking in too much. This want of width, added to the fact that the prow is always made of the broader end of the tree, renders these canoes very awkward in stormy weather on our lakes, inasmuch as they generally compensate in length what they lack in breadth.

Another fact worthy of remark is that the Carriers, who owe to their frequent intercourse with the Coast Indians, much of their technology and all such of their customs as are unknown to the rest of the Déné nation,* should have failed to take the hint from their maritime commercial visitors and build wooden canoes, until they appropriated, some seventy years ago, two rough "dug-outs" manned by a party of Iroquois hailing from the East.

Their paddles offer hardly any noticeable peculiarities, save perhaps the absence of the cross-like appendage at the end of the handle which is common among maritime tribes. This is explained by the different manner of handling the implement. While the Coast Indian when paddling seems to divide his strength between propelling forward with the left hand and pulling backward with the right, the edge of the wooden canoe being made to serve as a partial fulcrum for the lever in his hands, the Carrier, who unconsciously labours under the illusion that he is still manning a frail birch bark canoe, does all his paddling away from his dug-out without ever touching its sides. This exercise necessitates the peculiarly long shaft of his paddle and renders useless the cross-end of the maritime implement. The aforesaid illusion is so patent that even while at the helm, he scarcely ever uses his paddle as a rudder to steer his craft. He prefers to paddle out alternately to the right and to the left, thereby communicating to the canoe a kind of zig-zag course.

Fig. 104.

To return to the description of technological items. In fig. 104 we have an industrial implement whose destination cannot be guessed, inasmuch as its form is rather misleading. It is *not* an oar, but a *'ah-tcɔ̄s*. This compound word, when understood, prevents the possibility of any misconception as to the use of the object thereby determined. *'Ah* is the Carrier word for a species of fern whose bulbous root our aborigines greatly relish, and *tcɔ̄s* means "paddle," and by extension any paddle-shaped object. Hence this implement is designed to dig out the esculent root of the fern *'ah*. Yet, in spite of its name, it

* See my paper in the Transactions of the Royal Society of Canada, Sect. II. 1892, p. 109–126.

does frequent service as a mere *pe-yəs̄-hahẁozo** or snow shovel, as it is also used to clear of snow the doorway of habitations and space adjacent thereto. It should be remarked, however, that the prehistoric ·ahtcəs, was much ruder in form and finish than that herewith illustrated.

The bulb of this fern is eaten while fresh and baked *à l'etouffée* in this wise: "The natives dig out a hole about three feet in diameter in the ground, pave its bottom with heated stones over which they strew chips of alder (*Alnus rubra*) bark, and then fill it up with the roots. The whole is then covered with earth and the roots will be ready for the table ten or twelve hours later, that is when entirely cooled down."†

As far as I can ascertain, no such esculent root as ·ah grows in the Tsi|Koh'tin's country. But its absence is more than compensated by the presence there of two very useful tubers, *əsroñh* and *sânt̂*, which resemble respectively diminutive oblong and spheroidal potatoes. When these

Fig. 105.

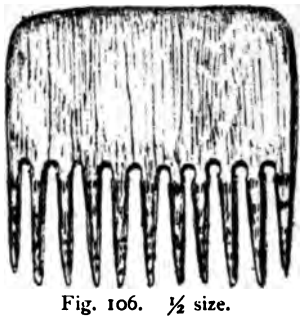


Fig. 106. ½ size.

have reached maturity, they are dug out with the T-shaped tool shown in fig. 105. As may be seen, there is nothing complicated in the nature of this implement, since it is nothing else than a birch branch cut off with its shoot. To ensure greater toughness to the material, its point is generally treated to a slight calcination. Immense numbers of the root are annually gathered. They are either boiled as potatoes or smoked in the house. For the latter purpose a sinew or buckskin line is passed through each of them, and while thus forming strings of vegetable beads, they are hung up near the chimney or the fire hole. The smoking process is rather long, and at its close, the tubers are eaten without any further preparation. I have also seen this method practised among the Tsi|Koh'tin with regard to the smallest of their potatoes.

From the culinary peculiarities of the Tsi|Koh'tin we may pass to their faculty of imitation and adaptiveness as evidenced by the herewith

* Lit. "wherewith-snow-is shaved off."

† The Western Dénés, p. 135.

figured toilet article which had been made and was used by one of them immediately before it was handed to me. If this comb stamps them as good imitators, it must be confessed that it entitles them to no particular claim to be ranked as artists. An examination of the cut will reveal the extreme simplicity of the process of fabrication of this article. A set of small holes have first been drilled with the hole-borer (fig. 130), after which the portions of the wood whose veins had thus been cut asunder have been extracted with the knife leaving out what becomes the tines or prongs of the comb.*

The original comb of the Western Dénés was remarkable for the length of its prongs rendered necessary by their peculiar way of wearing the hair prior to their first encounter with European civilization. In all probability, it was made in about the same style as the above Carrier comb (fig. 107) which is not a toilet article, but served the purpose of ritual observances. To secure success in his trapping or snaring operations, the Carrier had, besides lying down by the fireside, dreaming, etc., to make use of this three-pronged comb, which consists in the juxtaposition of as many wooden pins bound together with sinew lines.

Fig. 107. ½ size.

That our Western Dénés are indeed a self appropriating race is further evidenced by the *tɔn·i* or wooden cuirass which the Carrier warriors used to don as a protection against the enemy's arrows. This was composed, as a rule, of dried rods of *Amelanchier alnifolia* (or *Canadensis*) disposed in parallel order and held together by means of cariboo skin lines interlaced through the middle and near both edges. It was identical with the wooden armour formerly in use among the coast tribes from which it was undoubtedly borrowed. I have never seen any; but fig. 53, plate xv. in Niblack's "The Coast Indians of Southern Alaska" † will give some idea of its general appearance.

Composed of the same material was the *'kei-lla-thən*‡ or shield, which was oval in form as the Roman *clypeus*. The mode of manufacture only differed somewhat, as the branches or twigs of amelanchier were very closely interwoven. No specimen is now available for illustration.

Another wooden implement which, though I have seen in actual use, I cannot figure herewith for the lack of a specimen to draw from, is

* The Carrier name of the comb is *tsi-ltɔn*, "the head is curried," a verbal noun.

† Ann. Rep. U. S. National Museum, 1888.

‡ Lit. "willow (or birch)-the hand-hold"; 3rd categ. of nouns.

the *tcən-əst'ɲu* (sticks-interwoven) of the Babines. Its name indicates its mode of fabrication, but leaves us in the dark as to its shape or destination. Imagine a rough arm chair without legs and made of stout, split sticks of willow *(Salix longifolia)* or other wood secured by skin strings, and you have a perfect idea of its form. As for its use, it may be properly pointed out by a simple reference to the plate xx illustrating Ancient Mexican Carriers, in Cyrus Thomas' paper on the Manuscrit Troano.* The packing devices seem to be identical in both cases, while the modes of handling the implement appear to have been different. Our Western Déné women—useless to remark that among primitive peoples heavy work always falls to the lot of the woman—pack from the forehead with a skin line broadening in the middle, and, if the load is unusually weighty, the ends of this line are made to pass around the chest so as to render the burden more manageable. Among the Hwotso'tin, a fraction of the Babine sub-tribe, I have seen a woman thus packing, apparently with the greatest ease, her invalid husband, a man of more than average size and weight.

I shall purposely avoid speaking of the board boxes likewise used as carrying mediums by some of our Carriers, because they are imported from the coast, not indigenous to the Western Dénés.

These other objects which, as sociological items, are also due to the influence of the maritime tribes, but had become naturalized among, and were made by, the Carriers, were the *nîɲrivəs*, the *hanə'taih*,† and the *t'sak*. The first two are respectively the ceremonial rattle and mask, none of which can now be illustrated from existing specimens. These were almost the only objects of art of genuine Déné manufacture to which I can point, and yet I do not think I unduly depreciate my Indians' artistic capabilities by adding that they were rather below than above the average of similar aboriginal carvings. The masks were used only by mimics accompanying by grotesque gestures and jerking of the head the dance of a privileged few. But the rattles served a double purpose: they did service in connection with a notable's dance, being then held in the hand by the dancing personage himself, and also as an accompaniment to the incantations of the *niɲqən*,‡ or shaman. Both implements are, even at the present day, so common among North Pacific Coast tribes that no description of either is needed by readers ever so little *au fait* with American aboriginal paraphernalia It may

* Contributions to North American Ethnology, vol. v., p. 20.

†Lit. "that (round obj.) which is taken off;" the verb *ha-nes'aih* in the potential mood.

‡Lit. "he makes people sing." Not to forget that among most aboriginal races, song and magic are convertible terms.

suffice to refer less informed readers to the plates or figures illustrating Niblack's "The Coast Indians of Southern Alaska";* G. M. Dawson's "Notes on the Haida;†" W. H. Dall's "Masks and Labrets,‡" etc.

Fig. 108 illustrates an implement which, for the lack of another term we must call a rattle, though in shape, use and native name § it widely differs from the above mentioned ceremonial rattle. It is campanulate in form and is composed of a rounded piece of wood, hollowed out in its larger or bottom end and split asunder as far up as that part of it which serves as a handle. It was used by the participants in that aboriginal ceremony, the *thét'-səlrwəs*,‖ which I have described in a former paper.** By slapping against one another, its two halves produced a very sharp rattling sound which could be heard at a great distance.

Fig. 108. ⅙ size.

This is perhaps the proper place to mention another piece of Déné carving, the gentile totem, toad, grouse, beaver, etc., which on great festival occasions was exhibited as a means of attracting offerings, apparently to the said totem image, which were in reality presents, voluntary or due, to the givers of the feast. Of course no specimens of these carvings now exist among the natives.

The *t'sak*, the third borrowed sociological item mentioned above, was a canoe or trough-shaped vessel, sometimes elaborately carved to the arms of its possessor, I mean the totem animal of the notable to whom it belonged, and wherein food was served to the invited guests. This large vessel was brought into requisition on the occasion of extraordinary festivals only. Identical specimens are shown in plate xxxviii. of Niblack's book.

Another kind of wooden utensil called *t'sai* or dish, which was oftentimes inlaid with haliotis shells as an attempt at ornamentation, is also known to have been possessed by a few Carrier families. But I greatly suspect that the vessel, no less than its ornaments, had been bartered from among the coast Indians during the fairs which were periodically held on the borders of the Kitiksons' territory.

This brings us to the consideration of the Western Dénés' household utensils.

---

* Rep. U.S. Museum, 1888.

† Report on the Queen Charlotte Islands. Ann. Rep. Geol. Surv. Canada, 1878-79.

‡ Third Ann. Rep. Bureau Ethnol; Washington, 1884.

§ *ɣadə'ta'*, "from which there comes a slapping sound."

‖ "One runs out."

** The Western Dénés, etc., Pro. Can. Inst. Vol. VII, 1888-89, p. 154.

CHAPTER VII.

BARK IMPLEMENTS.

In no branch of aboriginal industry is the Western Dénés' and especially the Carriers' inferiority as workmen more apparent than with regard to their household utensils. Most certainly no more primitive ware could be imagined, both as regards material and workmanship. It has already been pointed out that no pottery or clay objects of any description ever existed among them. With reference to the Carriers and the Tsé'kéhne, the list of unknown technological items must be extended so as to comprise even the twined basket-work vessels so common among the majority of American indigenous races. These are replaced among the aforesaid tribes by corresponding vessels made of either birch *(Bitula papyracea)* or spruce *(Abies nigra)* bark. Only the coarser variety of vessels, thoes the object of which is but temporary, are made of the latter material, the remainder, those which are properly household utensils, being invariably of birch-bark.

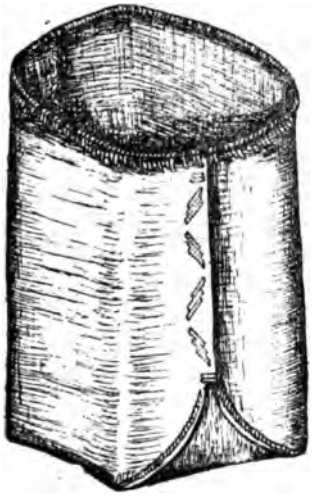


Fig. 109.

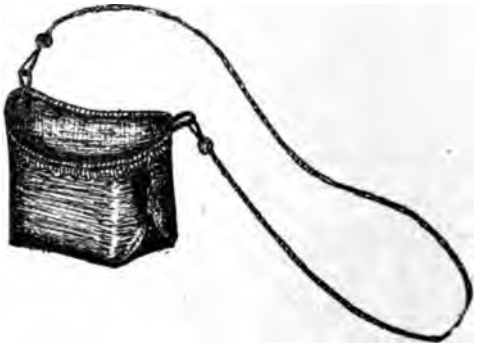


Fig. 110.

The most popular vessels among the Carriers are the two herewith illustrated. Both are of a single piece of birch bark, and this must indeed be understood of all birch or spruce bark utensils. The shape and cut of the material previous to sewing are represented in figs. 111 and 112. In the former figure, besides these, the seams and stitches will be

found faithfully delineated. The curved bold lines in the cut indicate the places of cutting preparatory to folding up the bark, and the dotted outlines stand for what becomes the outside edge corresponding to, and

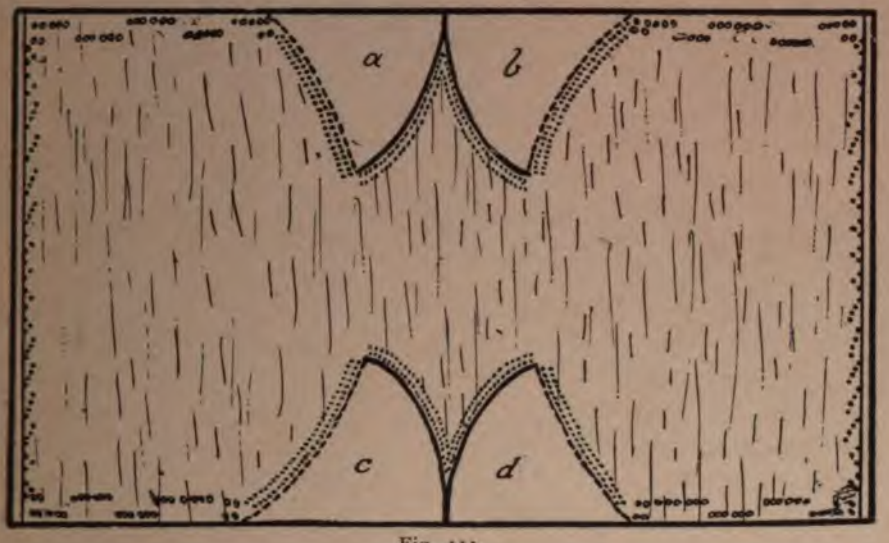


Fig. 111.

sewed with, the tapering piece of bark noticeable in the lower part of the finished vessel. Such portions of the material as are comprised between the bold and the dotted lines—*a*, *b*, *c*, *d*—are cut off once the adjacent

Fig. 112.

Fig. 113.

parts have been sewed. To give the necessary consistency to the rim, a rod is made to encircle it on the inside. Furthermore, to still add to the

solidity of the vessel and ensure greater neatness of appearance, wattup, or split spruce root, is made to pass through the bark and wrapped very tightly around the rod and rim. In order to avoid striking successively the same grain of the bark with the awl, the holes are pierced each receding backward till four or five have been stitched in, after which the first of a new series is made closer to the brim. To break the monotony of the wattup wrapping, small pieces of *tcən-na-t'qaɟ** or bird cherry (*Prunus pensylvanica*, Linn.) bark are inserted, generally in the middle of each of the four sides of the vessel, enough of their shining surface being left uncovered to be easily visible.

The largest of the bark vessels above illustrated is called a *tcaɟyaɟ*. It has, as a rule, a capacity of from three or four to ten gallons. As regards the uses to which it is put, they are manifold. While the women are gathering berries, it serves to bring home the fruit which has been immediately collected in the smaller or *theɟ* vessel (fig. 110). In the lodge the *tcaɟyaɟ* is also the recipient of clothes, the sewing implements of the women, the family heirlooms, the trinkets of the children, etc. Moreover, it serves frequently to cache up close by the houses any household chattels which it is thought expedient to protect against mice. When thus employed it is suspended, carefully covered with birch bark, from the lower limb of a branchy evergreen.

Some tcaɟyaɟ, while remaining identical in form, materially differ in their style of cutting and sewing. Of these fig. 113 affords a fair example.

None of the bark vessels of the Carriers is provided with a lid.

The second vessel, the *theɟ*, "receptacle," (figs. 110, 112) somewhat resembles the first in form and hardly differs in make, save of course, the altered cutting of the bark. But while all the tcaɟyaɟ are very deep and as nearly quadrilateral in shape as the material will allow, the orifice of the theɟ is oval and the vessel is proportionately more shallow. Moreover, all such specimens as exhibit a pretension to elegance have the middle of their length rims somewhat elliptical. Inserted between the bark and the encircling rod on both narrow sides are two buckskin thongs forming loops to which is attached the neat yarn string—generally adorned with multicoloured yarn tufts—which serves to suspend the vessel from the neck. The theɟ is carried on the breast, while the tcaɟyaɟ is packed, sometimes two at a time, on the back and the occiput. Sometimes, as is the case with the more stylish patterns, the cherry bark ornaments are replaced by dyed horse hair arranged so as to produce geometrical designs.

* "Stick which one tears around," by allusion to the mode of treating its bark.

The the[is above all a berry basket, but it does also frequent service as a drinking cup. Its size is subject to great variations, as it may contain from one pint to two gallons. Both tca[ya[and the[are to be seen in every Carrier household, and the latter especially is used so extensively that there is hardly any girl, however so poor, who does not possess her berry basket.

Fig. 114.

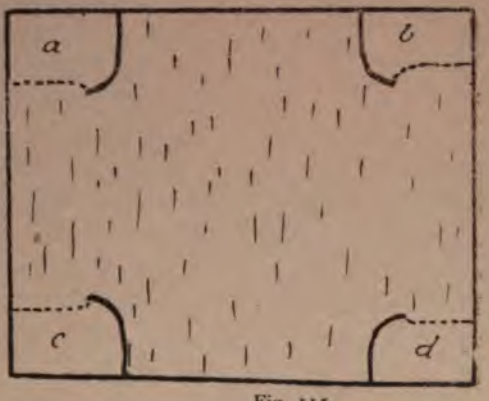


Fig. 115.

The vessel delineated in fig. 114 differs from the preceding in every particular except material and the setting of its rim. It is shallow, and almost rectangular in form, and the seams, instead of tapering from the corners to the centre of the ends as in the above described, remain confined to the corners. Fig. 115 will make it clear that its manufacture offers no serious difficulty. Here again the dotted outlines point to those portions of the bark which are cut off after the vessel has been sewed. As its main destination is to hold liquid, though but for a short time, whether this be water, grease, or berry juice, it is made perfectly water tight. Its native name is *t'sai*, a Déné root, which means tray, dish, or plate. The t'sai greatly vary in size, though they average a capacity of five gallons.

Fig. 116.

Very much resembling this vessel is the *t'ɔs-t'sai* or fish tray (fig. 116), which however differs not a little as regards both make and finish. It is without a single seam, the corners of the bark being merely folded up,

and the switch which encircles its rim is laid on the outside, instead of the inside, surface of the bark edges. This also lacks the thorough wattup wrapping of the rim, for which is substituted a spiral lacing of a coarser kind of spruce root. To prevent the thin birch bark from yielding too much to the pressure of the rim switch, a double lining consisting of two narrow strips of bark is applied against the vessel's edge both on the inside and on the outside.

It should be added that a few fish trays are also made with seams exactly as the common dish or tray (fig. 114).

The length of this vessel is generally double its width, which, in extreme cases, may reach as much as one foot and a half. It does service principally in connection with the daily net-fishing. The net, which has been left to dry during the day, is at dusk prepared for use at home, the floats and sinkers being there attached in their proper places. The whole is then carefully folded and deposited in this tray, after which the fisherman—or rather fisherwoman, since net fishing invariably devolves on the woman—proceeds to the spot in the lake chosen to set it. When it is withdrawn in the morning, two such vessels may generally be seen in the canoe, one destined to hold the fish, the other reserved for the net, which is folded therein as soon as drawn out of the water.

Fig. 117.

Fig. 118

No vessels of European or American manufacture have so far replaced any of the above described utensils. This is not the case with figs. 117 and 118, for which tin or copper vessels have long been substituted. The former, however, was still to be seen in actual use some ten or fifteen years ago. It was intended to keep water in; hence its Carrier name

thû-thej, "water-receptacle." This circumstance accounts also for its peculiar form—I mean the contraction of its upper part in faint imitation of the neck of a jar. Of course this vessel was made water-tight, the wattup used as thread being, after sewing, carefully pressed in with the finger previously coated with the balsam of the spruce (*Abies balsamea*).

The latter is the original Carrier kettle or boiler,* which is now altogether antiquated. It is seamless; the bark of which it is made has simply been folded up at its four corners and is so retained by means of a few stitches and of an encircling rod on the outside of the rim. Therein were boiled the roots, fish or meat of the family repast, and the aborigines are still loud in their praise of its excellence as a rapid boiler. Naturally enough, the frailty of its material required that care be taken lest it come in immediate contact with the flames. These primitive kettles were not only serviceable, but even much more durable than might be expected. In fact, their only part which was at all liable to get burnt was the wooden rim hoop, which had to be renewed from time to time.

On grand occasions, such as the famous "potlaches" or ceremonial banquets† so much in vogue among almost all the British Columbian tribes, large square boxes imported from the sea coast, were called into requisition. When filled with water and meat or fish, heated stones were repeatedly cast in until their contents were boiled.

The contrivance illustrated by fig. 119 consists of two parts, both of which are of spruce bark. Its object cannot well be understood without some details on one of the Carriers' most important industries, berry collecting and preserving.

Conspicuous among the various species of wild fruit which yearly ripens in profusion throughout their territory is the service berry (*Amelanchier alnifolia*). So important is it in their estimation that they generally call it merely *the* fruit, *mai*. At the end of every summer, the women gather immense quantities of it, first in their theɬ and then in their tcaɬyaɬ wherein it is brought home. When not eaten fresh, seasoned, as a rule, with bear grease or salmon oil, the berries are kept for future use under the form of large, thin cakes resembling plugs of tobacco. They are then prepared by a process which, if primitive, is not the less complicated

As soon as the desired quantity of the fruit has been secured, the Carriers build on the ground, in a sandy spot, if possible, the below

* *Nusai*, sec. root. The name of the modern kettle is *usa'*.

† *Horwənəta*, "the going near" a verbal noun, which confirms what I have written elsewhere, namely that such feasts, no less than several other practices, are of recent origin among the Western Dénés.

delineated boiler and tray. They commence by digging a shallow excavation in the sand into which they lay one end of a rough bark tray, thereby obtaining an oblique inclination for the whole vessel, the lower end of which is alone folded up. Inside the upper half of the tray, a boiler of corresponding width and made of a large piece of spruce bark is erected and secured in position by three sticks driven in the ground on the outside of both boiler and tray. This boiler has no other bottom than that of the tray wherein it stands upright and wherewith it forms an obtuse angle. As a consequence of this last circumstance an aperture is left between the bottom of the tray and the lower edge of the front side of the boiler, that facing the projecting part of the shallow vessel. A few twigs are there deposited which will act as a strainer with regard to the escaping juice of the berries. Once the boiler has been filled up with the fruit, heated stones are cast in which have the double effect of pressing down and boiling its contents. The juice escaping in the outer part of the tray is transferred when necessary to another vessel. The berries in the

Fig. 119.

boiler having considerably sunk down and the stones beginning to cool, a new supply of both is thrown on top of the mash, which operation is repeated as long as the size of the boiler will allow. After all the juice has thus been extracted, the residue of the berries is thoroughly kneaded, after which it is spread out in thin layers on willow hurdles previously covered with heraeleum leaves, and then exposed to the action of the sun and air. By frequently sprinkling the mash with the juice of the berries and letting it dry until it attains the proper degree of consistency,

it finally coagulates into cakes of uniform thickness which are then stored away for future use. When properly prepared, these will keep for years and if sprinkled over with a little sugar, they are of tempting succulency even to others than Indians.

ESCULENT AND MEDICINAL PLANTS.

Before proceeding further in our description of native utensils, it may not be irrelevant to complete our knowledge of the means of subsistence of the Western Dénés by a brief nomenclature of the other esculent berries, roots or plants they use as food, as well as of the chief medicinal herbs which they have, or had formerly, recourse to in case of bodily ailment. Their flora, such as represented in their vocabulary, is somewhat limited, inasmuch as, with very few exceptions, only such plants as have a place in their domestic economy are deemed worthy of a name. Question, for instance, a Tsi|Koh'tin about the native name of a beautiful flower which may strike your fancy, and if it is not that of an edible or medicinal plant, he will look at you wondering if your mind is not getting unbalanced and ask you scornfully: "Do you think that we eat such a thing, that we should have a name for it?" A great many berries they do eat, and therefore honour with a distinctive name These, added to those already mentioned in the course of the present monograph, are:

The small, low-growing blue berry (*Vaccinium myrtillus*) which is common in dry, stony places, such, generally, as are wooded with the scrub pine. These are gathered in the autumn and either eaten fresh, when they are very succulent, or dried and kept until needed for use. In this latter case, they are first boiled in a common tin kettle, then thoroughly kneaded, and spread, without extracting the juice, over small trellis, much as is done with the mash of the service berries. Their Carrier name is *yən-thə-mai* or ground berries.

A larger species of blue berries (*V. myrtiloides*) is also much sought after and treated, as a rule, as the small ground blue berries. Such is also the case with the swamp cranberry (*Oxicoccus palustris*) which, though rather scarce here, is none the less appreciated by the natives. The Carrier name of the former is *yaɬtsəl*, a secondary root; that of the latter *əya'-kə-mai*, or marsh berry, a noun of the third category.

Təɬqe is a large, dark-colored berry, (*Empetrum nigrum*) somewhat acid and very juicy. When not eaten fresh, or seasoned with bear grease, whole basketsful of it are deposited in long trough-like vessels of spruce bark, tucked up at both ends so as to form provisional receptacles therefor. After they have undergone the usual kneading process, heated

stones are thrown over the mash until it has boiled long enough to prevent its deteriorating with age, after which cakes are obtained by drying on hurdles, as practised with regard to the service berry.

A species of high bush cranberry (*Viburnum paneiflorum*), in spite of its pungency, is also much appreciated by the native palate. It comes to perfect maturity late in September, and is generally eaten with bear grease. But when it ripens early enough, and when the service berries are not kept in dried cakes, it is mixed with them to render them more digestible. The service berry, when eaten alone, is rather heavy on the stomach, and the addition of the cranberries is intended to correct this drawback. The Carriers call the high bush cranberry *tsaɂtsé*.

The soap berry (*Shepperdia canadensis*), which is so unpalatable to a white man, is not the least esteemed of esculent berries among the Western Dénés. It is either eaten raw or dried for future use. In both cases, it requires some preparation to become edible. After it has been mashed in a tin or bark vessel and sprinkled with a little sugar to soften down its bitter taste, it is vigorously stirred with the hand until it springs up into a beautiful rosy foam—whence its name—which is highly appreciated, especially on a hot summer day. If not needed at the time the berries are collected, their mash is put in a spruce bark vessel and boiled by means of heated stones until nothing remains but the roasted residue of the fruit. This is now given the form of the usual plug-like cakes by spreading and drying on hurdles and finally stowed away. When these are required for consumption, they are put in a kettle, dissolved in a little water, and stirred with the hand as in the case of the fresh berries and with similar results.

Two other species of single berried fruit called respectively *tcitcéstetcé** and *uontza* are generally eaten fresh. As far as I can guess, they belong to the genus *Viburnum*. The first, which grows only on mountainous soil, is black and resembles the service berry, but the natives claim that it is unknown to the whites. The second is a blue berry ripening on very tall bushes.

Nor should we omit in our nomenclature even the berry of the kinnikinik (*Arctostaphylos uva-ursi*), which is prepared for eating by roasting in a frying pan and mixed with salmon oil or the grease of any animal. Its native name is *tənih* in all the western dialects.

The natives also relish any species of edible—and sometimes to us non-edible—berries, such as the raspberry (*Rubus strigosus*), the straw-

* This name, though used among the Carriers, is of undoubted Tsé'kéhne origin.

berry (*Fragaria canadensis*), the black currant (*Ribes nigrum*), which the Carriers call "toad berry," etc. But none of these has the economic importance of those above enumerated.

Besides these and the bulbous roots *'ah*, *sûntî* and *əsroñh* which have been mentioned elsewhere, the Western Dénés find in their immediate vicinity several indigenous plants to diversify their daily *menu* of fish or meat. Chief among these may be quoted the red lily (*Lilium Columbianum*), the bulb of which is used as an article of food by most British Columbian and other American, or even Asiatic tribes. It is cooked by boiling pretty much as is done with potatoes. The natives harvest it almost as soon as it has sprouted out, a short time after the entire disappearance of snow. The Carrier and Tsi|Koh'tin name is *tsa-tcən* or "beaver-stick."

Another plant of a different botanical family whose root is likewise much appreciated as an article of food is the *səs* or sweet flag (*Acorus Calamus*). This root is eaten without any other preparation than cleaning and washing in cold water.

The wild onion (*Allicum cernuum*) is also eaten, root and leaves, either raw or slightly roasted in the ashes. The Carriers call it *t'ɲo-tsə'n*, "stinking grass." So is the root of the dog-tooth violet (*Erythronium giganteum*), which is reputed excellent by the natives. Its Carrier name is *tcilkhe-rez*, a compound word which is unfit for translation.

In the cow-parsnip (*Heracleum lanatum*), and a variety of the same (*kraz*, in Carrier) it is the inner part of the growing stalks which is preferred. It is often used while fresh and unprepared save by the stripping of its fibrous envelope. But if fire is at hand, a Carrier will generally treat it to a slight roasting through the flames previously to peeling off the stalk. The *H. lanatum* is the *kus* of the Western Dénés, a primary root, indicative of its importance in the estimation of the natives.

The marrow of the willow herb (*Epilobium angustifolium*) is also much esteemed, as is manifest from the nature of its Carrier name, Ras. It is eaten before the plant reaches maturity.

Nor do the Carriers disdain the leaves of the Oregon grape (*Berberis aquifolium*), which are simmered in a little water until no liquid remains. This plant, however, was formerly more sought after than is done by the modern Carriers, who call it *ə'tan-tcis*, "simmered-leaf."

Another article of food, cheap because very common, but not the least prized by the aborigines is the hair-like lichen (*Alectoria jubata*),

which grows hanging from most coniferous trees, especially the Douglas pine—hence its Carrier name *təh-ra*, "above-hair." The natives submit it, after gathering, to a thorough washing, till it loses its outer colouring matter. They next mix it with dough as one would do with raisins, and bake the whole. The lichen has then on the cake the same effect as would a copious application of yeast powder on a loaf of bread. The Carriers assure me that, thus prepared, it is very sweet and savory. Prior to the introduction of flour, they cooked it with grease.

Although the shaman's influence was great and his services frequently resorted to among the prehistoric Western Dénés, especially the Carriers, natural remedies such as provided by the vegetable kingdom were by no means despised by them. Nay more, their medical flora was rather extensive, and it may be said to their credit, that several of nature's most valuable secrets were no mysteries to them. Among the herbs or vegetable growths esteemed among them for their medicinal properties, I may mention the following :—

Tatlis (Polyporus officinalis), a fungoid growth from the Douglas pine. It was ground down into a fine powder and taken internally in a little water as a panacea against biliousness. According to the dose, it was a purgative or an emetic. It was very effective; so effective indeed as to be really dangerous. For that reason it has been altogether discarded in favour of milder laxatives such as the bark of the elder *(Sambucus racemosus)*, which is pounded while fresh and taken in cold water.

The young shoots of two species of spruce *Abies nigra* and *A. balsamea*, were, and are still frequently, used as a febrifuge or against any kind of complaint resulting in cutaneous inflammation or eruptions. The shoots are thoroughly boiled and the decoction drank while warm.

A decoction of the boughs of the juniper bush *(Juniperus occidentalis)* is also considered effective against such maladies as fever or measles.

In cases of such cutaneous eruptions as particularly affect young children, the diseased part is thoroughly smeared with the mash of the swamp cranberry *(Oxicoccus palustris)*, and it is claimed that beneficial results never fail to follow within an astonishingly short space of time.

The root of the aspen *(Populus tremuloides)* thoroughly chewed and applied on cuts and bruises, is very extensively resorted to as a sure means of stopping bleeding. Excellent and well authenticated results have more than once attested its efficacy. In urgent cases, the bark of the tree is used instead of the root.

The root of two other plants *ʔi-łəz-reh** a liliaceous plant, and the

* Lit. "Dog—urine—root."

heracleum, though of slower action, is nevertheless reputed effective against hæmorrhage from cuts. It is mashed fine, and a poultice of it is applied on the wound.

Infusions of the bark or leaves of the raspberry bush (*Rubus strigosus*) served as an emmenagogue, while the same parts—or more often still the wood with the bark—of the *Viburnum opulus*, a species of high cranberry, and of the bird cherry (*Prunus pensylvanica*), similarly treated, yielded a fairly good remedy against blood spitting.

They had also several tonics or astringents, among which figured: the wild cherry (*Prunus virginiana*), cold infusions of the inner bark of which were taken as a stimulant; the yarrow (*Achillea millefolium*) and the American sarsaparilla (*Aralia nudicaulis*), decoctions of which are still quite valued; the spearmint (*Mentha viridis*), which was used as a tonic against many ills, and last, not least, the Labrador tea (*Ledum palustre*), which, added to its medicinal properties, was often put to the same uses as to-day the tea of commerce.

In cases of swellings and non-running sores the Carriers use fomentations of the red willow (*Cornus stolonifera*) bark. For running sores and ulcers of any description they profess to have an excellent salve in the decoction of the bark of the osier-willow (*Salix longifolia*) and of the aspen mixed in equal quantities. The mixture forms a milky liquor wherewith the ulcers are first bathed and then rubbed over with the hand, thus causing the extraction of the humors.

Two species of horse tails, *Equisetum hyemale* and *E. pratense*, are valued as powerful helps against retention of urine. Decoctions of the herbs are drank freely until the desired effect is obtained. The leaves of the *uva-ursi* are also used as diuretics, but their properties may have become known among the natives through their intercourse with the whites.

One of the most effective of the native remedies is the *hwollak* (*Artemisia frigida?*) a sage-like plant which is used against local pains and nervous shooting. The leaves are laid over the heated stones of the sudatory, while the patient sits in a reclining position over the steam emanating from them. In extreme cases the leaves are applied while fresh directly to the ailing part of the body, but such are their caustic properties that they cannot be borne more than a few moments.

When no other remedy is available, the stalks of the black currant (*Ribes rubrum*) are cut in small pieces, boiled for some time and the decoction taken as a cough medicine.

To alleviate violent pains, they formerly had recourse to the bulb of

the hemlock (*Cicuta maculatum*), which they roasted over the ashes, and after crushing with the hand, they applied to the ailing spot. But owing to the poisonous nature of this root, they now refrain from using it for any purpose.

Of special value to the women as a help after parturition was the *hoopy*, a plant commonly known, I think, under the name of Devil's Club (*Fatsia horrida*). The bark was mashed while fresh and taken internally, with a few drops of water by women just delivered of a child, but long after birth had not been, or could not otherwise be, expelled. It did also frequent service as a purgative for persons of both sexes.

For such local diseases as sore-eyes had in the Carriers' estimation a special antidote in the vegetable kingdom. This consisted in a mixture of the root of the soap berry bush and of the wild rose (*Rosa blanda*) bark. After they had been stripped of their outside bark, the cambium like layer next to the wood was carefully scraped off, mixed with a few drops of clean water and delicately crushed with a flint or a knife till a sort of ointment was formed which was then applied to the eyes. Though sore eyes are by no means rare among the Western Indians, no application of this sedative ever fell under my observation.

Other plants or herbs are also used, the medical properties of which have been revealed to the natives by the H. B. Co. people or, later on, by the missionaries. But all those above enumerated are strictly aboriginal medicines.

OTHER BARK IMPLEMENTS.

I now come to the bark implements. Two models of bark utensils still vary slightly in form and much in use from those illustrated in the last part of this chapter are, or were, common among the Carriers. One is the trough shaped vessel already mentioned as serving to bail out water from the high cranberry. It is of spruce bark, of rude and temporary make and resembles the *t'ps-t'sai* or fish-basket in every particular save that it is deeper. Though it occasionally serves as a berry receptacle, it is more often used to cook for them in the heads of salmon or other large fish.

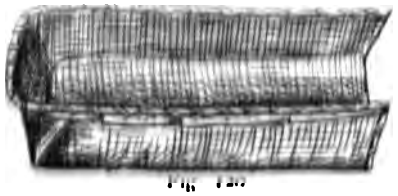


Fig. 120.

The last vessel of Carrier make which remains to describe is now a thing of the past. It was of birch bark, flattish and rectangular, and had but one narrow side (fig. 120). Its brim was, as usual, strengthened by the apposition of a willow switch running along its three sides. It served as a bathing tub for the infants

and, owing to its chief peculiarity, it had to be kept in a slanting position while in use.

The Carrier women originally carried their babes in regular cradles made of birch bark curved up at the narrow end as the basket-tray of our last illustration, save that this part was sewed, not merely stitched in one place as was the case with fig. 120. The bottom of the cradle was prolonged at the broad or open end to serve as a support for the head of the infant. Starting from both sides a hoop of willow half encircled at the proper distance the head of the child, and was intended to allow sufficient breathing room when it was deemed desirable to cover it. The necessary lacings were passed through a band of buckskin bordering the cradle on the outside.

With the advent of the whites these primitive cradles disappeared, to be replaced by the systematic swaddling clothes disposed as in fig. 121, which still obtain among the Carriers. Now, as in olden times, the lacing is done with one string passed through bands of cariboo skin ornamented according to the fancy of the mother. This string is so arranged that by pulling both ends the swaddling envelope is drawn up over the feet of the babe. Progressive mothers—and they form the majority—nowadays substitute for this tightening device strips of cariboo string buttoned at either end over each side of the swaddling clothes.

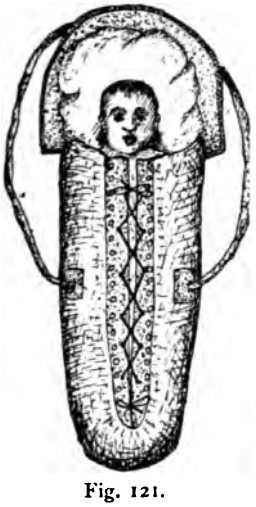


Fig. 121.

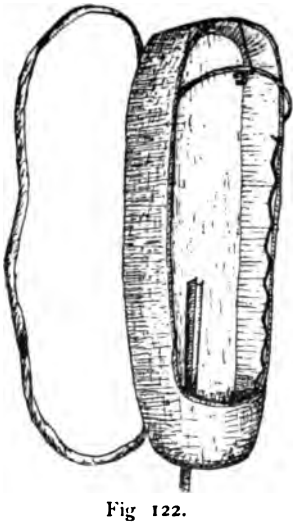


Fig 122.

The Tsi|Koh'tin have preserved to this day their traditional baby-baskets or cradles, of which fig. 122 will give a fair idea. They are made of the twigs of a species of willow, and their bottom is generally

strengthened by the addition of a board. The framework when completed is thoroughly concealed beneath a closely-fitting covering of deer hide sewed on the sides of the basket. As in the original Carrier cradle, breathing room is afforded by means of an osier hoop from which toys or playthings, beaver teeth or nails, etc., hang in sight of the child.

One peculiarity which I think is proper to the Tsi|Koh'tin baby baskets is the bark conduit which may be noticed in our illustration and whose end is to preserve the infant against moisture, and also to reduce to a minimum the trouble consequent upon bringing up such small children.

As the styles of baby cradles differ according to the tribe, even so it is with the mode of carrying them. A Carrier mother carries her child hanging perpendicularly on her back by a strap running across her shoulders and breast, while the Tsi|Koh'tin women carry their baby horizontally on their back and suspended in its cradle by a tump line passed athwart their forehead. In this they simply conform to the custom of their southeastern neighbours, the Shushwap.

The Tsé'kéhne vessels do not materially differ from those of the Carriers, and their mode of treating and carrying the Tsé'kéhne babies tallies also with that of the latter. But the household vessels of the Tsi|Koh'tin have no point of resemblance with any of those I have thus far described. No bark vessels are seen among them, as they replace bark by regular basket-work. I regret my inability to present the reader with an accurate description of their root weaving process. Yet, if memory serves me right, I think that they coil, not twine, the root according to the method illustrated by Prof. O. T. Mason in the Smithsonian Report for 1884 * and elsewhere. However, all the household utensils I have seen among the Tsi|Koh'tin are broad-mouthed and wallet-like, none of them tapering up as some of the specimens quoted by the learned professor.

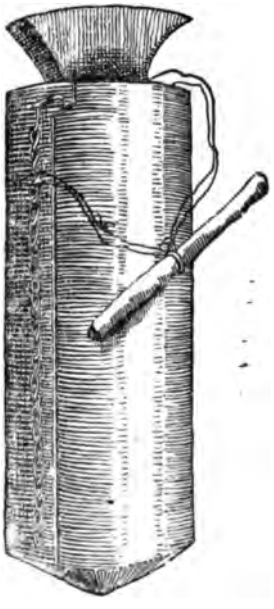


Fig. 123. ½ size.

Their water vessel, the form of which I remember well, is similar to that illustrated on page 18 of Dr. G. M. Dawson's "Notes on the Shushwap people of B. C.," † save perhaps that it is not quite so narrow at the bottom. Many of them are elaborately orna-

* Ann. Rep. Part II., p. 294, plate V.

† Trans. Roy. Soc., Canada, Sect. II., 1891.

mented with geometrical or animal designs. They are generally of about seven or eight gallons capacity.

A second vessel (*t'ɲasqaz* in Tsi|Koh'tin) much smaller and pan-shaped, does duty as a washing dish and receptacle for cooked food principally the starchy bulbs *sunt'* and *əsroñh*.

A third is elliptical and of about the same diameter across its breadth.

It is used as a washing-tub wherein the babies are made to stand naked to be washed every evening by their mothers.

Before we close this chapter, we should not forget to mention the birch bark *tsa-yu-thej* or castoreum bottle (fig. 123) such as it is used among the Carriers. The object of that implement has already been explained.‡

‡ In the chapter on Bone Implements.

CHAPTER VIII.

COPPER AND IRON IMPLEMENTS.

COPPER IMPLEMENTS.

Rev. E. Petitot, arguing in favor of the contemporaneity in the same part of America of the bronze and the iron ages with the palæolithic and the neolithic epochs, has the following to say :—

"Avant l'arrivée des Européans dans la vallée du Mac-Kenzie, les Couteaux-Jaunes et les Flancs-de-Chien connaissaient l'usage du cuivre natif qu'ils trouvèrent sur les bords de la rivière Copper-mine. Ils s'en fabriquaient des couteaux, d'où leur est venu leur nom. Ils faisaient en même temps usage de la pierre polie. Donc nous avons ici contemporanéité de la *pierre polie* et du *bronze*. De leur côté, les Peaux-de-Lièvre, qui ignoraient le cuivre et qui ne se dounaient pas la peine de polir leurs instruments de pierre, avaient découvert le long du Mac-Kenzie, à l'embouchure de la rivière *L'é-ota-la-delin*, du ferologiste, et ils en fabriquaient des aiguillettes et des alènes de quatre pouces de long qu'ils troquaient avec les Thekkané et autres tribus méridionales des Montagnes Rocheuses contre des peaux d'élan à raison de dix pour une alène." *

It is likely that most archæologists will refuse to concede that the use of copper knives by a savage people entitles the makers to be regarded as having reached that stage of industrial advancement commonly called the bronze age. The use of copper is in this case too limited they will probably say. This reason, plausible as it certainly appears at first, is after reflection rather more specious than convincing. For was not this the case even in the old world? Were not stone weapons largely used there contemporaneously with copper or iron implements? No, answers the antiquarian; each epoch or age was very distinct and strictly consecutive.

Let us see.

In Italy, C. Geikie found early uncoined money (*æs rude*) along with polished stone weapons; and a number of flint knives have been obtained from Etruscan graves. Indeed a piece of coined copper money marking

* *Rapport succinct sur la Géologie des vallées de l'Athabaskaw—Mackenzie et de l'Anderson*; Paris, A. Hennuyer, 1875.

a still later period has been found in an Etruscan tomb alongside with a stone knife. At Bibracte, the most important town of the Ædui in ancient Gaul, scientific exploration has brought to light work on metal and coins mingled with flint arrow heads, polished stone axes and a flint knife. Similar discoveries have been made in many places throughout France.* In ancient Egypt, stone and metal implements were also used contemporaneously.† In the centre and south of modern Africa, the negroes, according to Lenormant "have never known bronze, and work hardly any copper. Instead of this, they manufacture iron wares in large quantities and for this purpose make use of a process which was not communicated to them from the outside. Hence they themselves discovered the method of manufacturing iron, and when they gave up the use of stone implements, they passed to the manufacture of this metal."‡

These few instances chosen among many others will, I hope, suffice to prove that the sharp and almost instantaneous change from one age to another and the strictly successive order generally believed to have been followed in these transitions are, in many cases, more fancied than real. Metal objects were apparently the property of the leaders and the higher classes generally while the lower classes must have contented themselves with the stone equivalents, just as in the Middle Ages only the knights wore steel armour.

That copper and iron were to be found among the Carriers long before these aborigines even suspected the existence of the whites there can be no doubt. But the use of these metals was, of course, restricted to a few fancy objects or working tools. Moreover, in so far at least as that tribe is concerned, neither copper nor iron was indigenous and the former metal only was wrought by its members. Concerning its introduction among the Carriers, I take the liberty of reproducing here a short native legend which I have already quoted elsewhere.§

"In times not very remote, all the Indians (themselves among the rest) congregated at a certain point of the sea coast, around a tower-like copper mountain emerging from the midst of the water. Their object was to decide which tribe should become the possessor thereof. When all had united in shouting, the mountain began gradually to totter, and the Haidahs who are blessed with big heads and strong voices caused it

* See "Christian Anthropology," New York, 1892, p. 324.

† Ibid.

‡ "*Die Anfänge der Cultur*," vol. I. p. 57.

§ "The Western Dénés," Proc. Canadian Institute, 1888-89.

to fall on their side. 'Thus it was,' they add, 'that those Indians secured the copper mountain, and we have ever since been obliged to have recourse to them for what we require of that metal to make bracelets for our wives and daughters.'"

The reference to this wonderful towering mountain of copper, fantastic as it may appear, might perhaps be explained by the existence of the monumental Pillar Rock on the shore of Graham Island, a sketch of which will be found in G. M. Dawson's Report on the Queen Charlotte Islands.* Even in prehistoric times, some Carriers had evidently visited the Pacific Coast, as may be inferred from a few of their legends wherein some peculiarities proper to that region are introduced with a tolerable amount of accuracy. On the other hand, as most of their copper was imported from the coast, it was but natural that, according to the custom of primitive peoples of assigning a fabulous origin to extraordinary objects, they should associate in their narrative the wonderful pillar-rock with the no less wonderful yellow metal.

I might point here to the adventures of a mythic Carrier, a sort of wandering Jew, who underwent many a stirring experience on the Pacific Coast while in quest of a stolen wife, and who is the first personage mentioned as possessing copper. The fact that the possibly historical data hidden amidst the details of that legend are interwoven with many miraculous circumstances, would lead us to suppose that the knowledge of that metal among the Western Dénés dates back from a rather remote epoch.

Be this as it may, I have never met with more than five kinds of copper objects of genuine Carrier or Tsiɬkoh'tin manufacture. These

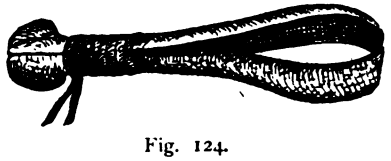


Fig. 124.

Fig. 125.

are the hair tweezers, the bracelets, the finger rings, the harpoon tips and the dog collars. The hair tweezers† were originally of cariboo horn. They then consisted of two thin pieces of horn given the required shape by means of heating, and tied together at one end with sinew threads (fig. 124). The copper tweezers were of one piece and affected the form represented in fig. 125. The object of both was to remove any super-

* Montreal, 1880; plate ii.

† *T'sɨ-anta*, "grebe-bill," a noun of the third category.

fluous facial hair. "Superfluous" should be understood here as synonymous with "any" hair growing on the lips, the chin or the cheeks, since the Western Dénés kept themselves beardless. The prehistoric Tsé'kéhne, if they are to be judged by their immediate successors, the eldest among the modern Tsé'kéhne, indulged in the possession of a queer looking partial moustache, which was obtained by leaving untouched the hair growing on the upper lip below, and exactly corresponding in width with the septum, while on both sides the lip was otherwise free of hair. The tweezers were worn on the breast, hanging from the neck. They are still to be seen among the Tsiɬkoh'tin and the Tsé'kéhne.

The Carrier *na-lthan* * or metallic bracelets (fig. 126) were of an exceedingly simple pattern. As the hair tweezers, they were originally of cariboo horn; but as commercial relations became more extended, copper was soon preferred in their manufacture. In later times pewter was even adopted and beaten to the desired shape out of the spoons of commerce. I speak in the past time, because among the Carriers especially, such trinkets are now practically unknown.

Fig. 126.

When bartered from the Coast Indians, the copper was generally in sticks or slender bars, which were then wrought by hammering by the Carriers. These bars remain almost unaltered when used to give consistency to the collars of their dog-harnesses.† When not ornamented, these harnesses are probably similar to those in use among the eastern Indians, and as such would hardly deserve any mention. But the Carriers' fondness of parade has long prompted them to add to the original pieces the blanket and collar ornaments which I have thought worth the while to show in fig. 127. Of course these two additions are detachable paraphernalia, which are not generally used, except when reaching or leaving a village. The frame of the upper parts is of copper.

Fig. 127.

* Lit. "it (of a heavy material) is around."

† *7i-t'7ul*, dog-ropes, 3rd cat. nouns.

Fig. 128 can be adduced as a further evidence of that power of imitation which I have more than once quoted as one of the characteristics of the tribes under study, especially the Carriers. Finger-rings,* it is hardly necessary to say, were unknown among the primitive Dénés; but they no sooner became aware of their existence among the whites than they set upon fabricating them with whatever material at their command. One of the results was the ring sketched above which has been found here, Fort Saint James.

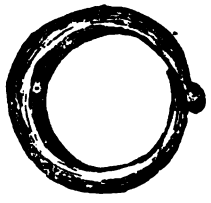


Fig. 128.

IRON IMPLEMENTS.

Whether hematite was known to the Western Dénés prior to their contact with European civilization cannot well be ascertained at the present time. It would seem highly probable that it was among all the tribes but the Carrier, which to-day has no other word for "iron" or iron ore than that used for "knife." Even among the Tsé'kéhne, who call a knife *pés* and iron *tsa-tsoñe* (beaver-dung), it is very doubtful if they ever subjected hematite to any treatment calculated to reduce it to the shape of a working tool. Yet I think I am warranted in asserting that iron implements have been known and used even among the Carriers for at least two centuries, that is one hundred years before they had heard of the whites. The memory of the appearance of the first iron axe at this place (Stuart's Lake Mission) has been kept vivid to this day by the descendants of its original possessor. Their narrative, when shorn of a few excrescences, I believe to be historically true, inasmuch as names of persons and of localities, together with minute particulars connected therewith, are freely mentioned. Their veracity is made still more apparent by the genuine and unbroken genealogy of the present chief of this village up to the first possessor of the marvellous implement. A full account of the deeds of the various personages introduced in the chronicle might prove not uninteresting even to the general reader. For the present I shall content myself with its initial chapter. The chief of Stuart's Lake will be our narrator.

"The first man (*i.e.* Carrier) who ever possessed an iron axe was my grandfather (*i.e.* one of my ancestors). His name was Na'kwəl, and, owing to his rank as one of the most influential notables, but more particularly on account of the great age he attained, he has remained famous among us. He was so old when he died that his hair had turned yellow, after having long been snow-white. He was a most irascible man and

* *La-thəl'to*, "passed round the finger."

therefore much feared. What his age was when he got the iron axe I cannot say. He must have been a grown-up man and full-fledged "nobleman," since tradition tells us that upon receiving it, he convoked a large crowd of Indians of clans differing from his to a grand ceremonial banquet. Now this can be done only by a təneza· or nobleman. On that occasion, the iron adze-blade was suspended from a rafter over the heads of the invited guests so that they might have an opportunity of contemplating it at ease. The implement was considered exceedingly precious. It had come from some unknown place in the direction of Tse'tcah.* It was thereafter taken great care of, and its possession was the means of considerably enhancing my grandfather's prestige among his fellow Carriers.

"Yet it was lost one day under the following circumstances. Some men of Na'kwəl's family were in the woods cutting spruce branches to cover up the doorway of the winter lodge they were erecting, when the skin line which fastened it to its handle as an adze getting loosened, the blade suddenly dashed off and fell among the branches already cut. By searching among these, the implement must have dropped down in the snow, for it could never be found by natural means that winter."

The story then proceeds to relate how it was subsequently found through the incantations of a medicine man who was richly paid for his trouble, and concludes thus: "This happened a very long time ago, long before my forefathers had heard of the whites."

That this is a fact is shown by a few words attributed to Na'kwəl which, though still intelligible, are nevertheless quite archaic, and also by the following genealogy of Na'kwəl's posterity.

1. *Na'kwəl* must have lived at least two or three scores of years after the acquisition of the iron axe, when he died and was succeeded in a genealogical point of view by

2. *Tcitcanit*, his youngest son, who had two wives and being of a jealous disposition, was secretly drowned by them when in declining years.

3. Tcitcanit was succeeded as *təneza·* or nobleman by a maternal nephew named *Tsalekuɣé*. This personage killed a man with an iron pointed lance, and was himself killed when he was getting much advanced in years.

---

* Near the Skeena river. See the map accompanying my paper, "Are the Carrier Sociology and Mythology Indigenous," etc.? Trans. R. S. C., Sec. II., 1892.

4. His successor was *Kwah*, who made war and slaughtered hosts of Lower Carriers. By a second wife he had

5. *Atsuʃ*, a second son, who died five years ago, over one hundred years old, since he remembered the arrival of Sir Al. Mackenzie's party in the country. He left three generations of descendants.

Reference has been made to a prehistoric iron pointed spear. Tradition furthermore records the killing, in ante-European times, of a cariboo with an iron or steel knife or dagger. This happened on this lake, some 15 miles from here. Below, the reader will also find figured a steel dagger which came into the possession of the Carriers some 110 or 120 years ago—their country was discovered in 1793. It was instrumental in killing several men and was originally much larger. The handle was also of a different description, the knife being one of a class of steel daggers called in the dialect of the Babines *t'ʃak-nanist'sər*, or "rounded at the end" (of the handle). It probably resembled the instrument represented by fig. 108 *e* of Niblack's "The Indians of Southern Alaska."*

Fig. 129.

The presence of steel implements, even so early and so far away in the interior of British Columbia, is not calculated to disconcert the archæologist, considering the frequent intercourse the inland tribes had from time immemorial with the Coast Indians. Both Cook and Dixon ascribe the introduction of such tools among the Coast tribes to the Russians whose first recorded expedition on the Northern Pacific Ocean dates from 1740. But Na'kwəl's iron axe cannot evidently be attributed to the influence of the Russians, since it had apparently reached this place long before I. I. Behring's expedition was fitted out. Coast Indians must naturally have been slow in parting with such valuable implements. Moreover it should not be forgotten that not more than fifteen years before the advent of the whites among the Carriers, iron tools were still so rare among the Coast tribes that in 1779 a Captain Gray master of one of the Boston trading vessels, is reported to have got at Nootka, on Vancouver Island, two-hundred otter skins worth about $8,000 for an old iron chisel!†

---

* Ann. Report, National Museum, 1888.

† Christmas No. of the Victoria "Colonist," 1891.

Among the steel implements distinctly Déné in manufacture and actually in use among the Carriers, are the hole-borer or drill, the moose skin scraper and the crooked knife or spoke-shave.

Fig. 130

The first is made with a nail or any available piece of iron securely lashed on the side of a stick or fastened in a slit at its extremity. Occasional holes are obtained by rubbing the drill between the hands while strenuously pressing down the implement. But when a set of fine holes, such as those of the snow-shoes, is desired, the Carriers have recourse, in

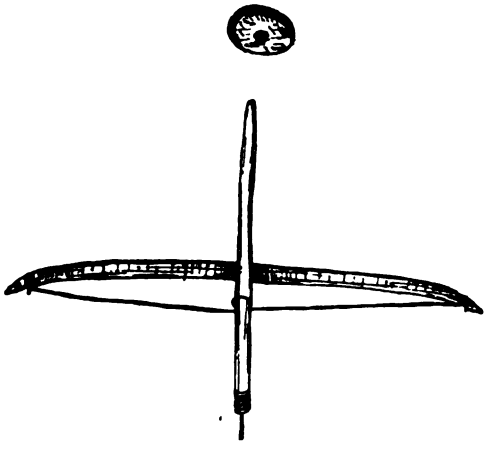


Fig. 131.

addition to the borer, to a small bow and a hard piece of wood which they manage as shown in fig. 131.

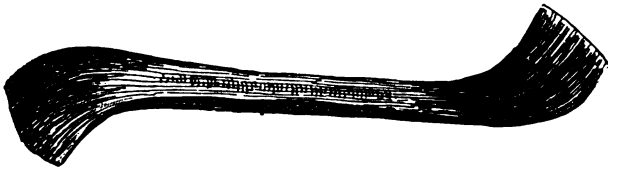


Fig. 132. ½ size.

The name of the tool shown in fig. 132, *ĭnrʉ̀ɔ̨ɬ*,* or moose skin scraper, explains its *raison d'être*. It has been patiently ground down to its present shape from an old file.

* Second category of nouns.

Identical material and mode of manufacture have likewise resulted in the accompanying spokeshave or *ɔras*, the "drawknife." It is of the greatest usefulness to the modern Indian, so much so that there is not a house among the Carriers wherein it is not to be seen. They employ it to finish the inside of their canoes, to shave off the rods used in the construction of their fish-traps, to fashion the side and transversal sticks

Fig. 133. ½ size.

of their snow-shoes, and to do almost any kind of manual work in connection wherewith a white man would use a draw-knife or even a common pocket knife. The lower grade of *ɔras* is made of the blade of a table knife. The handle of the specimen above illustrated is of cariboo bone, secured to the blade first by copper wire and then by rawhide lines wrapped around. The whole tool is of native manufacture.

CHAPTER IX.

Skin Objects and Twined and Textile Fabrics.

SKIN OBJECTS.

Under this head we will consider any native items wherein dressed or undressed skin enters as the chief component part.

Passing references to the treatment of hides have already appeared in the course of the descriptions of the implements used by the Western Dénés to free them of hair, fat or blood. It now merely remains with me to add that after the skin in preparation has been rubbed over with the brains of the animal, it is allowed to pass a whole night steeping in cold water. It is then subjected to several rinsings in hot water, alternating with thorough scrapings, until, being quite dry, soft and pliable, it is given the form of a bag and placed over the smoke of decayed wood or other vegetable matter. Once it has been thus smoked on both sides, it is ready for use.

Fig. 134.

Among the Tsi|Koh'tin skin dressing is practically confined to the hide of the deer, while among the Tsé'kéhne moose and cariboo skins

only are tanned for use. Moose is rare within the Carriers' territory, and still more so is the deer. Therefore, with that tribe, mocassins, mittens and gloves, bags, etc., are almost exclusively of cariboo skin. We will here pass over skin articles, which belong to the native accoutrement or wearing apparel, as these shall be treated of in the next chapter.

Confining ourselves to household or non-personal objects, we may mention no less than seven varieties of leather bags or pouches in use among the primitive Carriers. Fig. 134 represents the household bag or *eztʃai*. This is generally the property of women and serves to contain the family chattels, but more particularly such as are proper to the women, clothes, pieces of tanned skins, working tools, articles of ornamentation, etc. This bag needs no description ; the cut cannot but give an exact idea of its form. The bead work in some is much more elaborate than in the specimen herewith figured. Before the introduction of glass beads, dyed porcupine quills served to ornament this and all other kinds of skin receptacle. The cover piece of this *eztʃai* is also, I am told, a modern innovation. This bag is never used as a packing contrivance.

A variety of the same, but much reduced in dimensions, was formerly the regular badge of widowhood among Carrier women, so much so that the custom which required its use has given the Carriers their distinctive name. Among them cremation was the national mode of disposing of the dead. As a rule, on the morning following the funeral ceremony, the relatives of the deceased, accompanied by his widow, were wont to pick up from among the ashes of the pyre the few remaining charred bones which, if too large for the purpose in view, they did not scruple to reduce by breaking to the desired size, These were then handed to the widow to daily pack till her liberation from the bondage consequent on her new condition. This gruesome task devolved on her for the space of at least two or three years, and in extreme cases was prolonged to a period of some five years. Upon the final giving away of property which was the signal for the cessation of mourning, these bones were deposited with the satchet containing them in a box laid on the top of a funeral column near the village.

Some of these satchets were still in existence a few years ago. Their cover, instead of fitting over the whole bag as in the household *eztʃai*, reached only half way down. Its sides were also sewn with those of the satchet itself, so as to preclude the possibility of its contents being accidentally thrown out. Of course, a string was attached to the satchet and passed across the neck or or breast of the packer. A lining of birch

bark also gave the receptacle a certain degree of consistency, and served moreover as an additional protection for the bones.

The regular packing wallet * herewith figured is still very generally used for carrying provisions during long journeys and might be termed the native buffet. It is of two different materials ; its main parts are of undressed moose hide with the hair out, while its sides, top and bottom are of tanned cariboo skin. The skin of the upper part of the legs of the animal is chosen in preference and sewn together, as may appear from a glance at the illustration below. The packing band is also of untanned moose skin. On either side of the bag, ears of tanned skin are pierced each with two holes, the lower one of which is intended to receive the strap when the walllet is not full. The broad or middle part of this line passes athwart the forehead of the packer, and, after sliding through one of the holes at either side of the bag, its loose ends are drawn forward and tied over the breast, so that the position of the burden can be changed at will.

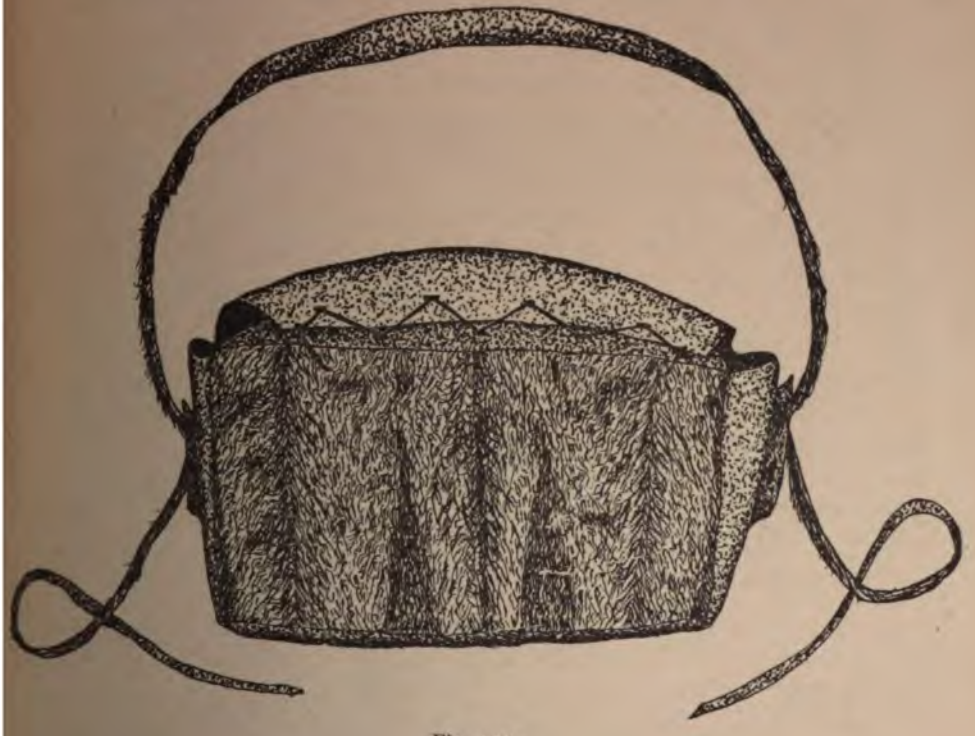


Fig. 135.

* Tu'kéz, sec. root.

Not uncommonly these wallets or knap-sacks are made entirely of dried salmon skins sewn together. Once the flesh of the fish has reached the proper degree of stiffness, it is carefully torn off and one of the skins is shredded into fine filaments which serve as thread.

The *ɟu'kéz* generally does duty in connection with heavy burdens, which means for anybody *au fait* with native sociology that it is the appanage of the women. The men have also a packing bag of their own intended as a receptacle of such light burdens as are incident to short trips, and which shall be described further on.

The fourth variety of leather bags is the dog-bag, which is so much like a common saddle-bag that I refrain from figuring it here. No harnessing device is connected with it, it is simply lashed on the sides of the canine with a separate line.

Fig. 136.

Fig. 136 also represents a double-bag; but this is proper to the huntsman. In one end of it he keeps his provision of powder, and in the other that of shot or balls. Both halves of the bag are shut by tying around the strings attached immediately below the common or middle opening. Out of this ammunition pouch the huntsman fills up as often as necessary his powder horn, and his ornamented shot pouch which are parts of his accoutrement.

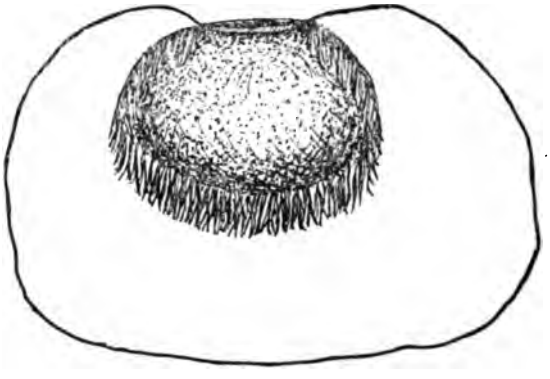


Fig. 137.

Here we have a *Kwən-zəz* or fire-bag. Its use has ceased with the introduction of matches, and its name is now given to a small pouch of different pattern, though somewhat similar in intent. The former served to carry about or keep at home the tinders and parched hay originally

required to start a fire with the fire drill or more recently with the fire steel. Its elliptical form was probably intended as a help in guarding its contents against rain or moisture. As an additional measure of precaution, the pouch was generally carried under the arm pit suspended from the neck.

Fig. 138.

Its modern substitute is of common cloth in the form of a flour sack and with two strings so arranged at its mouth that the pouch can be shut by drawing them apart. Matches and tobacco with a pocket knife are generally the only things kept in this Kwənzəz.

Fig. 138 represents a needle and thread pouch. Although originally of tanned skin it is now almost exclusively of black or blue cloth trimmed with ribbons or coloured tape.

To complete our list of skin objects of Déné manufacture, we should add to the above the *pe-ɜ̄ta* (wherein one sits), a sort of cuirass in use in prehistoric times especially among the Carriers. It had the form of a sleeveless tunic falling to the knees, so that it protected the whole body, since those aborigines generally shot kneeling. Its material was moose skin which, when sewn according to the proper pattern, was soaked in water, then repeatedly rubbed on the sandy shores of a stream or lake and dried with the sand and small pebbles adhering thereto, after which it was thoroughly coated with sturgeon glue. Being again subjected before drying to another rubbing over sand, it received a new coating of glue, and after this process had been repeated three or four times, it formed an armour perfectly arrow proof.*

*In his *Appendice relatif aux armes de pierre des Indiens arctiques* published in 1875, the Abbè E. Petitot, speaking of the Dénés of the Mackenzie Basin, says that "ces Indiens arctiques prétendent qu'ils n' ont pas toujours habité sur le sol où nous les avous trouvés, mais qu'ils ont vècu, à une époque fort éloignée, dans une patrie plus belle que la présente. . . . Dans cette terre . . . bien tour dans l'occident, un peuple puissant opprimait les Loucheux et les Peaux-de-lièvre. Ce peuple se rasait la tète, portait de faux cheveux et se coiffait de casques. . . . Ses guerriers se couvraient la poitrine d' une tunique de peau d' élan revêtue d'une foule de petits cailloux coagulès en manière d' écailles (cuirasse); ce qui les rendait comme invulnérables à leurs traits. . . . A cette époque les Déné-Dindjiés faisaient, disaient-ils, usage de lances, qu' ils m' ont dépeintes comme des couteaux fixés par une ligature au bout d' une perche; d'épieux, sorte de cornes munies d' un crochet et également emmanchées; d' arbalétes; de dagues, et enfin de boucliers." Then the learned missionary adds that "*aucune de ces armes offensives et défensives. . . . n'a suivi les Déné-Dindjiés en Amerique.*" The italics are mine, and it is hardly necessary to remark that the line thus pointed out would never have been written had its author been acquainted with the original Carrier sociology. For, as

OBJECTS OF MIXED MATERIAL.

As may be seen by figs. 139 and 140, the Déné drums, though possessing minor characteristics of their own, do not essentially differ from the tambourines in universal use among the North American Indians. In every case we have merely a dressed skin—which is here of cariboo—stretched ove a narrow hoop. The Carrier drum (fig. 139) not only had no bottom strings, but its makers even dispensed with any cord as a means of holding the instrument. The same piece of skin in which almost consisted the whole drum was cut on the reverse or back side into four strips tapering to the centre into regular strings which were knotted as shown above, *b*, and which served as a means of grasping the instrument.

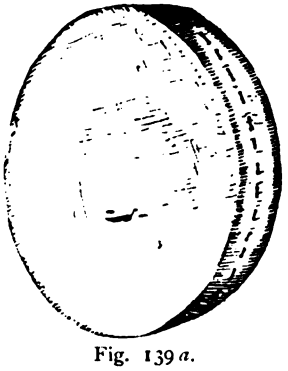


Fig. 139 *a*.

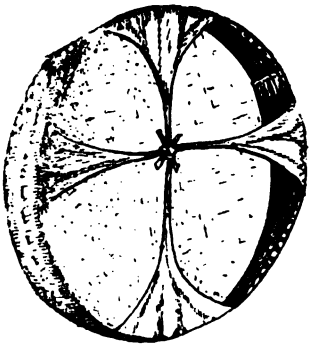


Fig. 139 *b*.

The Tsé'kéhne drum (fig. 140) though apparently a very simple piece of workmanship, evidences much greater ingenuity on the part of its contrivers. Not only does it possess the bottom strings designed to enhance its sonorousness, but these very strings are so disposed that they help not a little in using the instrument. After passing beneath the frame of the drum they are drawn up over it under the encircling skin, and again introduced through the middle of the hoop from which they protrude inside in the shape of a loop through which the thumb is passed

---

a matter of fact, all the arms and defensive weapons above enumerated had their counterparts on this side of the Rockies but a short time ago. In that "skin tunic covered with small coagulated pebbles," we recognize, of course, the *pe-ŝta* just described; the lances regarded by Petitot, after his informants, as so very ancient were the *sɔRthz* spoken of on page 62; the épieux or spears are not materially different: Petitot describes them as "hafted hooks" and it so happens that the Carrier name of these weapons means "hook-sticks." The cross-bows we have likewise seen in use among the Tsé'kéhne, while the daggers and the shields were no less common among the Carriers. Nay more, even the "false hair," or wigs were in vogue here as late as thirty years ago. These will be found described in our Chapter on Dress and Personal Adornment.

with a double object in view: that of helping in holding the instrument and of tightening or loosening the bottom strings at will and thus regulating the sound of the drum.

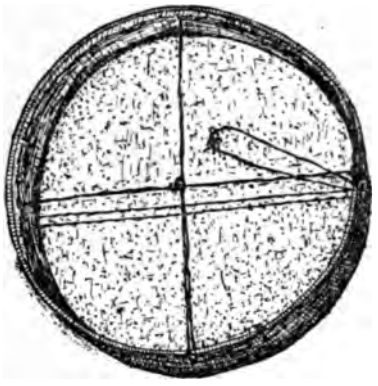


Fig. 140.

That portion of the Carrier—and possibly the whole of the Tsi|Koh'tin —tribes which is adjacent to the Bilqula Indians formerly used square drums. But this circumstance should be regarded merely as a further evidence of the Western Dénés' innate power of imitation. The drums are called *thañrəle* in Carrier.

Any stick at hand, padded or otherwise, served to beat the drum.

It seems almost incredible that in a country, where for at least five full months every year snow covers the ground, snow-shoes should have been practically unknown until a comparatively recent date. Yet, if we are to credit the natives, this was formerly the case with the Carriers, the most populous, and, actually, the most progressive of the four Western Déné tribes. The Tsé'kéhne used snow-shoes from time immemorial; but we are told that not more than 100 years ago, only the most prominent among the Carriers possessed that indispensable adjunct to winter travelling. Therefore with that tribe winter hunting was formerly well nigh impossible. The natives still relate how their ancestors painfully trudged on trunks of trees chopped down so as to form a continuous line or trail over the snow whenever necessity constrained them to wander any little distance from their winter quarters. I fully expect that their story will task the credulity of my readers, and I give it only for what it may be worth. I am simply repeating here what I have been told many a time.

Be this as it may, the Carriers are to-day as well provided with winter walking implements as they profess to have been originally destitute of

them. Apart from the snow walking stick, they now have no less than four very distinct varieties of snow-shoes *('aih)* each of which is known under a different name. These are the *khé-la-pas*, the *ɟəťɟu*, the *'aih-za* and the *səs-khé*.

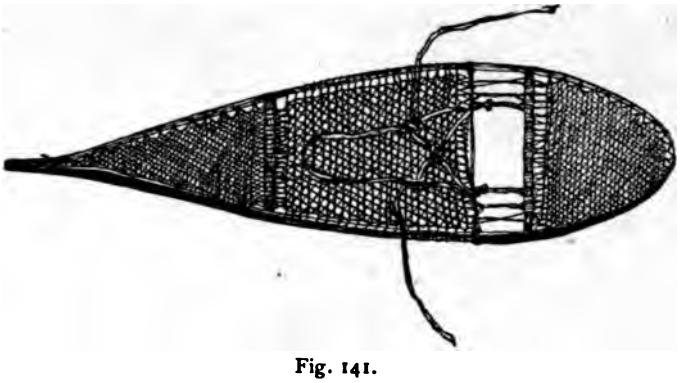


Fig. 141.

The *khé-la-pas** was the first model of snow-shoes known to our aborigines. It is still used in cases of urgency, when better or more fashionable snow-shoes cannot conveniently be made or, under all circumstances, by poor or unskilled people. Nevertheless this form is now obsolete, and is generally laughed at by the possessors of more elegant implements. The ground stick of this snow-shoe is of one piece from fore-end to tail, and the whole is left flat, as is the case, I think, with most of the snow-shoes in use in Eastern Canada. Fig. 141 represents a *khé-la-pas*.

The finer netting or filling of every Carrier snow-shoe is of delicate cariboo skin lines, and the coarse or middle one is of moose rawhide line. As these implements are said to be adventitious here, I will refrain from going into the details of the netting process which our Indians are not likely to have materially altered since the introduction among them of these winter commodities. Suffice it to say that a whole independent filling in is made out of a continuous string. The ground or side sticks are generally made of young saplings of black spruce or of Douglas pine *(P. murrayana)*; but those of mountain maple *(Acer glabrum)* or of mountain ash *(Pyrus Americana)* are more esteemed, though heavier. In all cases the cross-sticks are, as a rule, either of willow or of birch.

In fig. 142 we have the most recent type of Carrier snow-shoe. It will be seen at a glance that it is not inelegant. It is the *ɟəťɟu* or "stitched together" by allusion to the peculiar form of its head. To

* "Mocassin (or *chaussure*)-end-rounded;" by allusion to its form.

facilitate walking, this is curved up and so retained by means of two or three lines twisted in one solid cord. To add to the gracefulness of the fore-end and prevent it from shrinking in, an additional bar is inserted some distance therefrom, and the resulting tension is also corrected by a transversal cord binding fast the extremities of the two sticks. The ground netting passes under both bar and cord. The name of this variety of snow-shoes indicates that the side sticks were originally united at both ends by means of stitches of skin lines; but to-day small nails or screws are more commonly used. Little tufts of coloured yarn issuing from each side of the frame are intended to add to the elegance of the implement. Such ornaments at the hind part of the snow-shoes distinguish the women's from the men's snow-shoes.

Fig. 142.

The artificial bending of the side sticks is obtained by two different methods. In the first case, such parts of the wood as are to be worked upon, are carefully wrapped with strips of willow bark and thoroughly heated by close application to the fire. They are next gradually pressed up with the hand or by forcing against the ground, when their ends are solidly tied so as to prevent the wood from returning to its original shape. However, this is more commonly steamed or rather "cooked" in boiling water, such parts of the sticks as cannot be introduced in the kettle or boiler being operated on by pouring thereon spoonfuls of hot water until they have become sufficiently pliable.

A third model of snow-shoes quite as common, if not more so, is the *·aih-za* ("snow-shoe only," or ordinary snow-shoe). In this, as in the preceding, two sticks are employed to form the frame, but instead of terminating in a sharp front end, their fore-ends are thinned and joined together with a strong lashing of rawhide lines thereby forming a rounded instead of an angular head. In other words, this snow-shoe is a long khé-la-pas made out of two side sticks and curved up in front as the ɮət'ɮu. Therefore the additional cross-stick and string noticed in the latter are wanting in this unpretentious style of snow-shoe.

The Tsé'kéhne snow-shoes are remarkable for the number of their cross-sticks. They generally have six of them, three in front, and three back of the middle or coarse netting. They thus gain in solidity what they lose in lightness.*

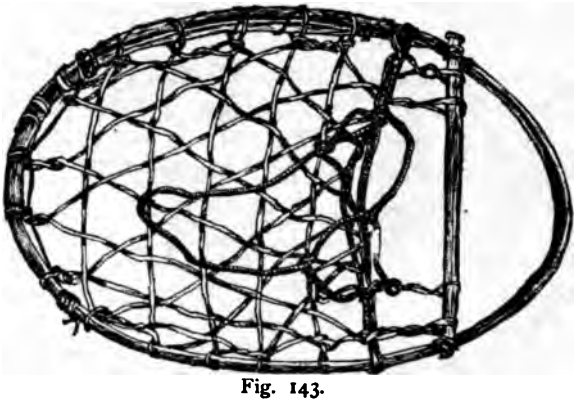


Fig. 143.

The last variety of Carrier snow-shoes is herewith figured. Its form will no doubt explain its native name, *sɔ̄s-khé*, "black bear foot." It is proper to little children before they are sufficiently grown up to use the common snow-shoes. Not unfrequently, women, especially those who are poorly circumstanced or unprepared for a heavy fall of snow, will be seen wearing similar, though of course much larger, snow-shoes. Naturally the frame of such primitive implements is composed of only one stick whose ends are rudely lashed together. Instead of having the cross-stick notched in as in the above figure, it is more generally forced in a shallow hole mortised at either side of the frame.

Fig. 144.

As these implements are essentially temporary, they are often of a rude description. Such is not the case with the *ɲɔt'ɲu* and the *·aih-za*. Not only are the wooden parts of these carefully shaved and scraped over, but they are generally daubed with red ochre, and in not a few cases covered with a coat of red or blue paint.

* The reason of this is their great length which is intended to deaden the creaking of the frozen snow caused by the short snow-shoe, and thereby not to betray the approach of the hunter.

Here we have the winter walking-stick * already alluded to. It renders to the hand of the traveller over snow fields the same service as the snow-shoe does his feet, since its circular appendage (fig. 144)

Fig. 145.

prevents the stick from sinking too much in deep snow. It has moreover another very valuable advantage which I have tried to illustrate through fig. 145. The hand of the hunter, warm and trembling from the excitement of the chase, if passed through the leather loop which often

Fig. 146.

Fig. 147.

accompanies the upper part of the staff, can thereby be steadied and find a reliable support for the barrel of his gun while in the act of

* *Thɛ-mas*, "walking-stick rounded" by allusion to the circular appendage.

firing. Despite these undoubted advantages, this walking-stick tends to become obsolete in several localities.

But one implement now remains on our list of undescribed wood-and-skin items. This is the ice-scoop or *ɟupas* of which an idea may be gathered from fig. 146. It is brought into requisition to scoop out of the hole one is making in the ice the broken pieces driven in with the *ɑtɛ́* or ice-breaker. The frame is usually of mountain maple. Fig. 147 will explain the connection between the strings and the frame.

TEXTILE AND TWINED FABRICS.

We now come to the twined and textile fabrics of the Western Dénés. The latter are very few ; indeed the weaving industry might almost be described as null among those tribes, since the rabbit skin blankets were originally the only genuine textile fabric manufactured among either the Carriers, the Tsé'kéhne or the Tsi|Koh'tin.

The weaving of these could hardly be more primitive. The first step is of course to spin, or rather to twist on the naked thigh, the strips of the rabbit skins. These are previously steeped in water to facilitate the cutting and spinning operations. Each skin is made to yield one single band, and each band is knotted end to end so as to form a continuous cord.

A frame or loom is first erected with poles of the proper dimensions and secured either by planting the two side pieces in the ground, or, more commonly, by leaning them against each wall of any corner in the house. Over the two cloth-beams, the skin cord is wound so as to form the warp. As for the woof, a separate strip is knotted in its middle part to the last left hand thread of the warp in such a way that two threads result which are then twisted together, then entwined with the next warp thread, again twisted together, again entwined with the next perpendicular thread, and so on until the last thread of the warp is reached, when the operation is resumed from the right to the left. Each successive woof thread is added immediately under the preceding one so that the weaving, if weaving there be, is always in a downward direction. Whenever the web becomes too low for the convenience of the weaver, web and warp are made to revolve on the loom beams up to the suitable height. The web is then momentarily steadied by means of a string attached on either side to the perpendicular poles of the loom. No batten or any similar device is used. Fig. 148 will give some idea of the whole process. The cut *a* represents a cross-section of the web.

a

The Tsi|Koh'tin and Carrier women now weave fairly good belts or girths out of the yarn they get at their trading posts. But this is a new industry among them and we need not tarry in its description. Suffice it to say that they use wooden healds as those of the Zuni Indians. Indeed, I think that the whole method of girth weaving is practically identical with these two heterogeneous stocks.

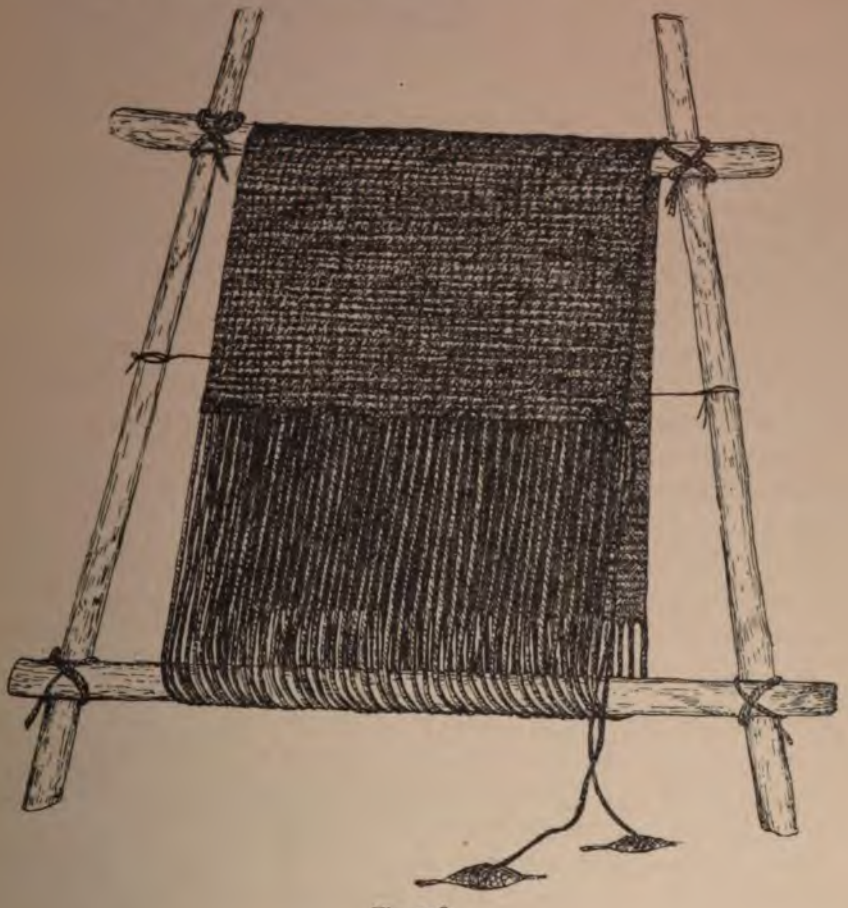


Fig. 148.

The Tsi|Koh'tin women also weave or plait mats commonly used to spread on the floor or ground instead of a table cloth, the *menu* of the family repast round which each person squats while partaking thereof. The material is a sort of rush or juncaceous plant, the exact species of which I could not determine. Matting is an unknown industry among the Carriers and the Tsé'kéhne.

With regard to the mode of netting, the drag-nets of the Western Dénés are of two kinds: one is intended for service against any species of fish, with the exception of the sturgeon, and the other is of use to capture the latter fish exclusively. Fig. 149 will explain the manner of

Fig. 149.

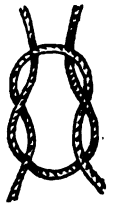


Fig. 150.

knotting the sturgeon net, while all the other kinds of netting, whether drag, scoop, or dip-nets, or even, the packing bags which shall soon be described, are knotted, as shown in fig. 150.

No mesh-stick is used while the Carrier is working at the smaller varieties of nets. It is replaced by the middle finger of the left hand. In this case, the netting-needle also consists merely in a narrow piece of board scalloped at either end to receive the twine which is wound around. But when at work upon large-meshed nets, our aborigines have recourse to the picture frame-like wooden implement herewith figured. This is

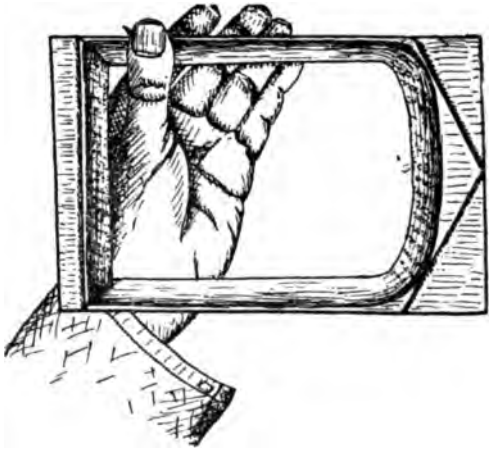


Fig. 151. ⅓ size.

carved out of one piece and serves as a mesh-stick. It has replaced the original wooden horse-shoe made of a bent twig. In this case a regular netting shuttle is also resorted to. As this is in every particular identical with that common among white fishermen, it is but natural to infer that it is here a borrowed article.

The meshes of the sturgeon net are about ten inches square, while those of the beaver nets are based on the distance between the tip of the thumb and that of the index finger when both are outstretched. The width of any kind of fish-net of the larger variety corresponds with that of seventeen meshes of the same net. The nets intended for smaller fish have their meshes from ¾ of an inch to one inch and a half square. About twenty of the former dimensions form the width of the net. All kinds of drag-nets measure at least one hundred feet in length.

Among the Tsé'kéhne both hands outstretched with the thumbs tip to tip are the standard measure for the width of the beaver net. Large nets require twelve such units, while the smaller ones have only nine, or thereabouts. Such nets never exceed twenty-five feet in length.

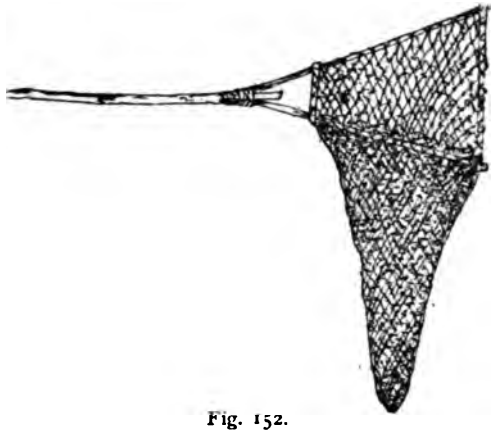


Fig. 152.

Identical in netting are the two kinds of dip-nets * in use among the Carriers. The first (fig. 152) serves either to catch salmon or to scoop out the smaller fish which periodically swarm up certain shallow streams. When doing service against salmon, it is dipped in the water and then left until a capture is effected. But if used to catch small fish, it is managed as a ladle. Its make will be easily understood by a glance at the above figure. It is from five to six feet deep.

Fig. 153 represents a smaller variety of the dip-net. It serves in a few places only, and, as a rule, its period of usefulness does not exceed four or five days in one year. During the first warm days of each recurring spring, immense numbers of the *thʔmək*, the very small fish which we have already mentioned in another chapter, ascend to the surface of the water in a few lakes and become an easy prey to the Indian women who, armed with this net, scoop out canoe loads of it in

* *Pe'-thəʁaih*, "wherewith one scoops," a verbal noun.

one single day. Less than a week thereafter, not a fish will be seen of the myriads that were basking in the sun. Of course, the meshes

Fig. 153.

of the dip-net resorted to as a means of securing them are proportionally small. They are scarcely a quarter of an inch square.

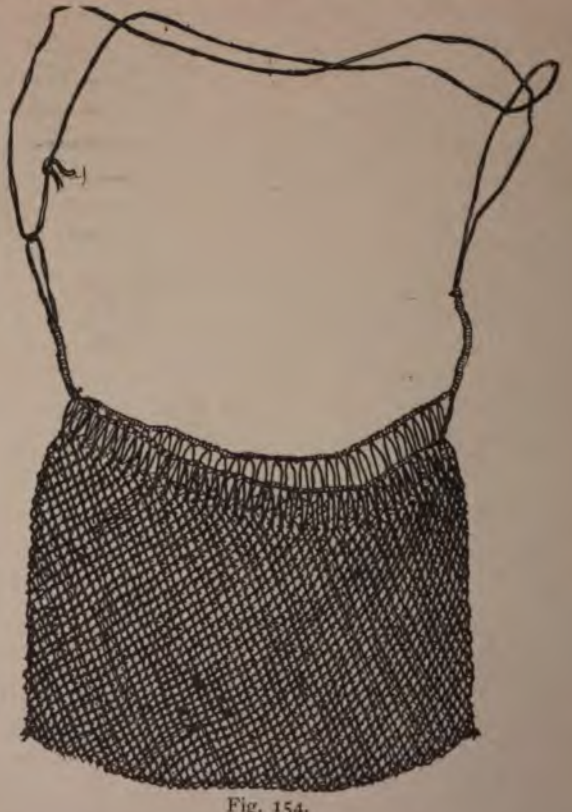


Fig. 154.

The nets of our aborigines were originally of the fibre of either the nettle (*Urtica Lyallii*), the willow (*Salix longifolia*) bark, or a species of

wild hemp called *hwonɔɻ·a* in Carrier. The plants were carefully dried in the house, crushed with the hands, and their fibres extracted by pulling up with the right from the left hand, pressing the stalks down on the ground. The shreds were then spun by twisting on the thigh. Naturally this was the work of the women. Nowadays fine Holland twine is used instead.

Though the skin of the beaver is occasionally used to make beaver-nets —as is the case when the animal is found so decomposed that its fur has lost its value—yet such nets are generally of cariboo skin cut in fine strips called "babiche" in the parlance of such Indians as parade an acquaintance with the dialect of the H. B. Co's. employees.

Such is also the material of the *t'ɻuɻ-ən'kez'*,* or packing bag of fig. 154. This is to the men what the moose skin wallet (fig. 135) is to the women. It serves to carry to short distances light burdens such as a lunch, peltries to the trading post, provisions for an unimportant journey, etc. It is also very commonly used as a game-bag. The above figure represents the t'ɻuɻ-ən'kez' such as is still made among the Tsé'kéhne, and as it was originally among the Carriers. But of late years the latter, having learned from their missionaries to have a greater regard for the physical weakness of the gentler sex and to do themselves at least a part of the packing, use it for heavier burdens than those for which it was originally intended. This has rendered the rounded cord through which it is carried uncomfortable. It is now replaced by a regular leather thong, which also runs round the rim of the bag.

* T'ɻuɻ means "rope," and the desinence of the compound word *'kez*, which implies "direction, tendency" towards a place, is common to all packing devices.

CHAPTER X.

DRESS AND PERSONAL ADORNMENT.

COMMON DRESS.

It would be difficult at the present time to reconstruct in all its details the national dress of the prehistoric Western Dénés, if indeed there ever existed any national or uniform costume for each and all of the different tribes and sub-tribes under study. Sir A. Mackenzie, in his account of the voyage of discovery he made in 1793 through part of their territory, might perhaps enlighten on this subject the reader who can have access to his narrative.* Not enjoying this advantage, I must content myself with what I have learnt from daily intercourse with the most reliable among the older Carriers.

Speaking of the dress of the Eastern Dénés, the Rev. E. Petitot has the following to say :—

"Outre la blouse de peau blanche à queues décorées de franges et de breloques metalliques, qui fut le costume primitif des Déné-Dindjié et que portent encore les Loucheux, ceux-ci, ainsi que les Peaux-de-Liévre y joignent un pantalon de même matière et aussi richement orné, qui est cousu avec la chaussure. Il est porté par les femmes comme par les hommes. Les tribus plus méridionales remplacent le pantalon par les cuissards ou mitasses que des jarretières retiennent aux jambes, et par un pagne oblong d'une étoffe quelconque.

"La robe des femmes est trés courte et orneé d'une profusion de franges, de houppes de laine, de verroteriès et de breloques sonores. La chaussure générale est le mocassin, ou soulier de peau molle qui emprisonne et dessine le pied comme un gant le fait de la main. Durant l'hiver le renne, le castor et le liévre arctique sont mis à contribution pour fournir à l'habitant du désert des vêtements aussi chauds que légers et commodes.†

That the dress of the Western Dénés considerably differed from that of their Eastern congeners such as above described is beyond the possibility of a doubt. And no wonder. Being of an imitative turn of

* Voyages from Montreal, on the river St. Lawrence, through the continent of North America, to the Frozen and Pacific oceans; in the years 1789 and 1793, etc., London, 1801.

† Monographie des Déné-Dindjié, p. xxiv; Paris, 1876.

mind, and living, most of them, in close proximity and with frequent intercourse with the Coast Indians on the one hand and the Shushwap on the other, they could not fail to accommodate themselves to their environments. It may be taken for certain that their wearing apparel was, as a whole, rather meagre and scanty. This remark does not apply to the ceremonial costume of the Carriers, which, as will soon be seen, was quite elaborate and complicated.

The summer dress of the men consisted mainly, if not entirely, of a tunic, the breech piece, the leggings and the mocassins. The tunic was a loose vestment which the Indians now compare to a shirt. Its material was tanned cariboo skin, and it descended to the thigh or thereabouts. It had no tail-like appendage as that of the Eastern Dénés. This tunic was uniform neither in cut, nor in material, as poor people made it of almost any available skin with the fur on, and gave it the form best suited to their means. Well-to-do Carriers decorated this garment with a multitude of fringes to conceal the seams. The strands of these were sometimes further embellished by means of porcupine quills dyed yellow or green.

The breech-piece and the leggings were also of the same material, cariboo skin. The latter covered the legs in their whole length, and were kept in position by a string tied to the leather belt on each opposite side. They were furthermore secured below the knee by means of ornamented garters (see fig. 145). These breech cloth and leggings without trousers were still worn here by a few men not more than twelve years ago. Leggings of identical style are still in common use among the men, but during the winter months only, and they are now worn over the pants.

The national foot gear is, and has always been, the mocassin. This was originally of the dressed skin of the elk *(Cervus Canadensis)*. But the poorer classes frequently made it of untanned marmot skin, or even of the skin of the salmon. The mocassins are now uniformly of dressed cariboo or moose skin among the Carriers and Tsé'kéhne and of deer skin among the TsilKoh'tin. An idea of their present form may be gathered from fig. 142.

Owing to the nature of the material of these mocassins, our aborigines generally went barefooted in rainy weather, and to-day the women and the children at least still adhere to this custom. It must be added that, progressive as the Carriers are, there is not among them a single man who would undertake a journey of any importance, nay even a short trip, without the traditional mocassins. Even the most advanced young men profess to be unable to walk any considerable distance with our common leather shoes.

All the Western Dénés wear mittens, which are made of the same material as their mocassins. Even during the fair season, they will never do any kind of manual work without having them on. They are suspended to a cord of plaited yarn passing behind the neck and over the shoulders, so that, even when they are not in actual use, there is very little risk of losing them. The wrist-band is invariably ornamented with stripes of blue and red cloth, together with colored ribbons, according to the fancy of the wearer.

Gloves are now used, but were unknown in prehistoric times.

Instead of the hood common among their kinsmen of the Mackenzie Basin, the Carriers formerly wore a dainty cap of marmot skin made in this wise:—A band, some three inches broad, was cut from the skin with the hair on and secured at either end so as to form a crown-like head-dress. Over this was sewed a circular piece of similar material leaving out a brim of the same width as that of the band. This projecting part of the skin was then slit into a fringe which rested gracefully on the original head-band.

This description applies to the summer cap. The winter head-gear consisted of a hemispherical bowl of woven rabbit skin strips without fringes. Both summer and winter, men and women wore the same style of cap.

The summer dress of the women did not materially differ from that of the men. The tunic was simply longer and oftentimes ornamented round the shoulders and back with a row of pendent cariboo and beaver claws or teeth. For the sake of convenience a girdle also secured the folds of that robe over the waist. They wore, and among the Carriers continue to wear, leggings like the men.

During the cold season both sexes, but more especially the women on account of the outdoor work to which they were subjected, added to the foregoing a sort of small blanket of undressed skin of any small fur-bearing animal which covered their breast from the neck to the waist. This pectoral blanket was attached with strings behind the neck and also secured by the outer girdle round the waist. We have already seen that in olden times a swan's skin sometimes served an identical purpose.

The body was further protected against the inclemency of the season by means of a large cloak of lynx skins sewed together and worn with the hair outside. The more conservative half of the Tsi|Koh'tin tribe have retained to this day the use of this fur cloak. But it is worn among them with the hair next to the body, and the material is, as with the poorer Carriers, marmot instead of lynx skins. The Tsi|Koh'tin women

transform it into a sort of gown by tying it round the waist with a girdle of leather, from which hang beaver nails or teeth, old thimbles or shells of exploded brass cartridges which produce during their walk a jingling sound much appreciated by the native ear.

Winter and summer, the members of the three tribes under consideration wrap their feet with square pieces of blanket, *khé-thəl** which are to them the counterpart of our stockings.

With the advent of the whites the dress of the Western Dénés gradually changed, until it became, what it is now, practically that of the H. B. Co.'s people, with the few additions necessitated by the nature of the former's avocation. However, skin coats identical with that illustrated through fig. 145 are still occasionally met with, especially among the Tsé'kéhne and Babine tribes.

The foregoing remarks, as I believe, will give a fair idea of the aboriginal costume such as it obtained among the Western Dénés, without reference to rank or age. But, when treating of the natives' wearing apparel, one should not forget that even their psychological ideas are not without influence on its nature. We should remember that most dreaded creature, the pubescent girl. She was considered among the Carriers so much of an *être à part*, that she must constantly wear some badge to remind people of her terrible infirmity, and thereby guard them against the baleful influences which she was believed to possess. This consisted in "a sort of head-dress combining in itself the purposes of a veil, a bonnet and a mantlet. It was made of tanned skin, its forepart was shaped like a long fringe, completely hiding from view the face and breasts; then it formed on the head a close fitting cap or bonnet, and finally fell in a broad band almost to the heels. This head-dress was made and publicly placed on her head by a paternal aunt, who received at once some present from the girl's father. When, three or four years later, the period sequestration ceased, only this same aunt had the right to take off her niece's ceremonial head-dress."†

The latter sentence applies to the daughter of untitled parents. In case the maiden was of noble birth, the first anniversary of her entering

---

* "Foot-platform." The native names of the different parts of the wearing apparel are herewith given, as they may afford a clue, when considered from an etymological standpoint, to the relative degree of importance or antiquity of the articles thereby denominated. Head-gear of any description, *t'səR*; coat or tunic, *tzût*; breech-piece, *tsan*; girdle, *sé*; cloak (and blanket), *tsət*; leggings, *khé-tsih* (wherein-the-foot-is-passed); mocassin, *khé-skwət*, or in composition *khé* (synonymous with "foot"); pectoral blanket, *pətsichuz* (that—being a soft stuff—which covers), a verbal noun.

† The Western Dénés; Proc. Can. Inst., 1888-89, p. 162.

upon her maturity witnessed the imposition, with befitting ceremonies and the usual banquet, of a sort of diadem such as herewith figured.

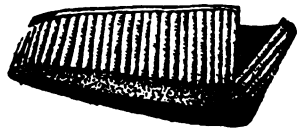


Fig. 155.

The ground part of this was a band of tanned skin which was fringed from about one inch and a half above the bottom up to the top. Each strand of that fringe was passed through a dentalium shell and then sewed up at the top to an encircling strip of skin. As this crown was lower on the back than in front, shells of different lengths were chosen according to the place they were to occupy, A lining of skin, with or without the fur on, was then added, and the lower corners of the ends stitched together, as shown in the cut. Upon crowning the maiden with this shell diadem, the paternal aunt became heir to the discarded bonnet with fringe and mantlet.

Both diadem and bonnet were articles of every day wear, and genuine ceremonial head-dresses.

Not only pubescent girls, but even such boys as were reaching the same stage of life had their fingers, wrists and legs encircled with rings or bracelets made of sinew entwined with down. Neglecting these precautions would have exposed the careless party to premature infirmities and incapacitated the young man for the fatiguing exercise of the chase.

The Western Dénés of the old stock, and especially the Carriers and the Babines, were not wanting in articles of personal adornment. Among head ornaments, they had the ear-pendants, the nose ring or crescent, the *ni-kə-dîn'a*, the hair pendant and, among the Babines, the labret.

Two very distinct varieties of ear-pendants* obtained among the Carriers. The first consisted in a bunch of four buckskin strings passed through pairs of dentalium shells and hanging from the ear, as shown in fig. 156. As soon as glass beads became known, some were inserted between each of the two shells suspended from each hole in the ear. A small beaver claw furthermore prevented the pendent shells and bead from slipping off. Several Indians still bear the marks of this now antiquated pendant.

A different kind, which was still in honour but a few years ago, but is now likewise obsolete, is the haliotis pendant (fig. 157). The specimen from which I have drawn fig. 157 was in actual use when obtained for my collection. Pendants of this material probably affected various forms. Yet I fear that no other specimen could now be found among our

* *Tzokwəl.* 2nd. cat.

aborigines. Considering that fine shreds of sinew were formerly, as they are to-day, common in every native household, it would appear, judging by the coarse line of buck skin appended to this "jewel" that very little regard was entertained in olden times for the sensibility of the human ear.

Fig. 156.

Fig. 157.

The dentalium pendant was proper to men, while the latter or haliotis ornament belonged to the fair sex. With insignificant exceptions, neither the men nor the women now wear any ear pendant or ring, except among the Babines, whose *tɔneza'* or noblemen have adopted the silver ear-ring,* proper to persons of similar rank among their alien neighbours, the Kitiksons.

As among the majority of savage or barbarous peoples, in contra-distinction with civilized nations, the Western Dénés were formerly fond of perforating their septum to introduce therein what they considered wondrous ornaments. These might be divided into three different categories: the crescent, the discoidal or cruciform pendant and the silver ring.†

The two first ornaments are figured above, and were of haliotis shell. The crescent was, of course, inserted to the middle through the hole of

* See Niblack's The Indians of the Northwest Coast, plate vi. fig. 13.

† All the nose-pendants are called *ni-spas, ni*, a contraction of *nih*, "nostrils;" *spas*, the root of *nanispas*, "ring-like"

the septum, the cusps hanging down. Others were contracted enough to permit of being worn ring fashion with the cusps grasping the septum as those of the ancient Peruvians.* I have seen Babine women wearing through the septum a silver crescent of identical size with that figured above.

Fig. 158.

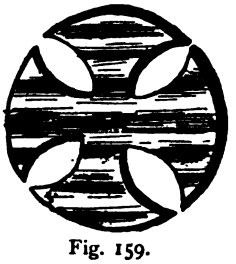


Fig. 159.

The circular nose-pendant (fig. 159) was placed in position by pressing the fore part of the septum through the cusps formed by the deep indentations carved out in the shell until the septum hole was reached. The proximity of the points or cusps then prevented its falling off.

As for the third variety of nose ornaments, it consisted in a silver ring which was more than once of ridiculously generous proportions. Indeed, if I am to credit my informants, this was, among the Babines, of such a size that one could easily eat through it. I have never seen any.

All the above nose ornaments were used indifferently by men or by women. A fourth, which it was the privilege of the women of rank to wear was the *ni-kə-dîn·a*, or "passed through the septum." Fig. 160 will

Fig. 160.

explain its form, without doing justice to the material of which it was composed. Two pairs of dentalium shells, the small end of the one

* See "A Study of the Textile Art," by W. H. Holmes, vi. Ann. Rep. Bur. Ethnol., Washington, 1888, p. 237, fig. 343.

inserted in the large end of the other, were kept springing out, as it were, from the septum by means of a sinew thread running from end to end of the shells and through the perforated nasal partition. The extremities of the "ornament" were adorned by a small tuft of the red down of the head of the wood-pecker *(Ceophleus pileatus)*. This ornament was rarely exhibited outside of ceremonial gatherings.

It can already be inferred from the foregoing that the Western Dénés prized as much the dentalium *(D. Indianorum)* shells as their kinsmen who now inhabit the Hupa valley, in California. That the esteem of the former for the red scalp of the wood-pecker is not confined to them may be gathered from a perusal of Prof. O. T. Mason's "The Ray Collection from Hupa Reservation."*

Fig. 161.

Lastly, with a view to enhance their natural attractiveness by means of extrinsical ornaments, the young men and young women attached on either side of their hair, a little above the ears, bunches of strings decorated with dyed porcupine quills and beaver claws† or, more recently, holding glass beads of various colours sometimes ending in copper buttons, as is the case with fig. 161. Until a few years ago, these

* P. 231.

† *Nimpa-stla*, "they lie on the face-edge," a verbal noun.

were to be seen occasionally in a few remote places. As all other articles of native adornment, they have now completely disappeared.

In the course of his paper "On the Masks, Labrets," etc., W. H. Dall gives the following definition of the labret. "The labret, among American aborigines, is well known to be a plug, stud, or variously-shaped button, made from various materials, which is inserted at or about the age of puberty through a hole or holes pierced in the thinner portions of the face about the mouth. Usually after the first operation has been performed, and the original slender pin inserted, the latter is replaced from time to time by a larger one, and the perforation thus mechanically stretched, and in course of time permanently enlarged."* As regards the nature, mode and time of insertion, these words are in every way applicable to the labrets† of the Babine sub-tribe. When these had reached the maximum size which they were to retain for life, they were a flat button, oval in circumference, at least one and a quarter inch long by three-quarters inch wide, of a hard wood, commonly mountain maple *(Acer glabrum)*. The insertion of the tentative bone pin was the occasion of special rejoicing and feasting. The women only were entitled to this piece of ornamentation, and, as a rule, the higher the rank of the wearer the larger the labret was to be.

So much for the head ornaments. Other pieces of aboriginal jewelry of every-day wear were the *tsi-neɟthan*, the *tsi-nezdîlya* and, in later years, the *na-ɟthan* and the *la-tcən*. With the exception of the last, which is a compound noun of the third category, all these words are verbal nouns descriptive of the trinket thereby differentiated.

The two first mentioned were the Dené necklaces. The *tsineɟthan* was obtained by boiling and splitting off a thin band of a cariboo horn, which was given, while still pliable, the desired form. As an attempt at ornamentation, geometrical designs were scratched with the stone knife, over which a pinch of diluted red ochre was rubbed with the hand. The colouring matter passed over the smooth surface of the horn, but remained in the light furrowings which were thus brought into greater prominence. This primitive method is still common among the Western Dénés. Charcoal, instead of vermilion, is sometimes used.

The *tsinezdîlya*,‡ was a necklace of dentalium shells which was liable to affect different forms, as the shells were threaded in such a way as to fall over the neck or to encircle it lengthwise. A similar necklace,

* Third Ann. Rep. Bureau of Ethnology, 1884, p. 76.

† "*Ni-ta-'kéz*, man (*i.e.* human)-lip-over."

‡ "That (a composite object) which is put around the head," *i.e.* the neck.

but larger and worn resting over the shoulders and breast, was a badge of the possession of shamanistic powers on the part of the wearer.

The *tsinezthan* was of so primitive material that its adoption as a means of personal adornment must have been rather early. Though the material of the tsinezdilya was an imported article, this necklace could, according to the following Carrier narrative, boast of an at least as great antiquity, unless we assign a recent origin to the actual plumage of the loon.*

"Once upon a time, there was an old man who was blind. He had a wife who used to help him in this way to keep alive: whenever she sighted game, she would hand him his arrow to moisten the stone point thereof with his saliva—for this old man was possessed of magic powers. Then pointing the arrow in the direction of the game, she would let him release it himself, which he usually did with good effect. One day, both came upon a very fat cariboo—"Moisten the arrow-head with your saliva," said the woman to her husband, which after he had done, he shot dead the animal. But his wife, who coveted the fat of the cariboo and was tired of living with a blind old man, pushed him aside, thereby throwing him to the ground, saying: "That old fellow,† what a bad shot he is!" —'But I think I have killed it,' insisted the old man. Yet as he was blind, he could not get the game, and while searching for it, he strayed a long distance from his wife who now abandoned him.

"As soon as the old man was out of sight, she set to cut up the animal, helping herself at the same time to large fried slices of its meat. What she did not eat on the spot she cut into thin pieces and hung out to dry.

"Meanwhile the old man was bewailing his fate. In the course of his aimless wanderings he had reached the shore of a lake, when a loon hearing his cries swam towards him as his kins are wont to do even now whenever they hear anybody talking in the forest.—"What ails you"? he said to the man.—'Poor wretch that I am, my wife has left me, and I am blind,' answered the latter.—'I will cure you,' said the loon; 'come over to me and hide your eyes in the down of the back of my neck. The old man did as he was bid, and both the loon and himself plunged in the water. When they reappeared on the surface, they found themselves at the opposite end of the lake.—'Now can you see'? quivered the loon. 'Look at yonder mountain,' he added. The old man complied with the request and answered: 'I see a little, as if through a mist. Repeat the

* This tale is also current among the Tsi[Koh'tin.

† *Tɔnethi-'qɔl.* The desinence of this word is expressive of spite and scorn.

operation.' Again did the loon dive with him, emerging this time at the original point of departure. 'Now can you see'? asked the loon.—'I now see very well,' replied the old man wading ashore. Then to show his gratitude to his benefactor he presented him with his own dentalium shell necklace, and taking some more dentalium shells from his quiver, he threw them * at him.

"Ever since, the loon wears a white necklace, and the shells which hit him also produced the white spots we now see on his wings.†"

Now that we are satisfied as to the great antiquity of the dentalium necklace, we will leave the old man of the story to settle with his unfaithful spouse, and return to the description of the other articles of adornment obtaining among the Western Dénés.

The *na-ɣthąn*‡ is the horn or metal wristlet which has already been described and figured (see fig. 126).

Fig. 162.

As for the *la-tcən*‖ it is of modern origin, and is an imitation of the ruffles of the whites. As such, it is worn in winter time as a protection against cold. But many Carrier or Tsé'kéhne girls nowadays wear a variety of it merely as an ornamental addition to their costume. To that class belongs the *la-tcən* herewith figured. It is of glass beads of several colours mounted on sinew threads. The rosette in front is made of narrow ribbons and a common mother-of-pearl button.

CEREMONIAL COSTUME.

It has already been hinted that the ceremonial costume of the Carriers, was very elaborate. When one keeps in mind their proximity to the coast Indians who are so fond of parade and display, this statement cannot surprise. What would rather astonish those who have read a former paper by the writer wherein the wonderful faculty of imitation characteristic of the Carriers is chiefly brought into relief is the fact that though the sociological peculiarities which gave rise to this costume were evidently borrowed, yet the latter was, in the main, original. It was proper to the *təneza'* and the *t'sèkhuza'* or noble men and women.

* "Threw them" and "presented them" are rendered by the same word in Déne.

† The loon of this story is the *Urinator pacificus* of the naturalists.

‡ "That (being of a naturally long material) which is around."

‖ Lit. "hands-stick," same word as that for "wrist."

Ceremonial banquetting, distribution of clothes or victuals, dances, incineration of the dead, etc., were the most common pretexts for its exhibition.

It will be noticed that the nature of its adorning material was rather monotonous and little varied. This consisted principally in the dentalium shells * interspersed with beaver claws and cariboo hoofs, pelts of small animals, the feathers and down of a few species of birds and porcupine quills.

The latter were invariably dyed, and here it may be explained that the Carriers, at least, knew but two varieties of dyes: yellow and green. The yellow colour was obtained by boiling the quills with a species of hair-like lichen apparently akin to the *Alectoria jubata*, but botanically different (*Evernia vulpina*). The green dye was no other than the decayed wood found almost everywhere in the forest. The colouring matter was likewise extracted by boiling. An analogous method is now followed, to dye in red or blue the plumes with which the young men are fond of ornamenting their hats and the horse hair which serves to embellish the instep piece of their mocassins: the original dye of the cloth or stuff procured at the trading posts is simply extracted and transferred by boiling.

The distinctive pieces of the noble man or woman's ceremonial attire were: the wig, the coronet or *'tasťɲu*, the breast-plate or *yostəthəɲ*, and the *Raz*. With the exception of the third, of which I know but one specimen, none of them can now be seen outside of my collection. Each one was formerly so prized that it was the appanage of the full fledged təneza· only. All the other parts of the costume, such as the leggings and the mocassins, were of course proportionately rich and ornamented.

I possess two specimens of the ceremonial wig or *tsi-'kə-stzai* † and both differ in make and style of ornamentation. Fig. 163 represents what is perhaps the most elaborate in design. As no cut can do full justice to its details, I may be pardoned the following description. It is composed of three distinct parts: the horn-like appendage, the cap or head covering proper and the pendent train. The horns are made of the stout bristles of the sea-lion's whiskers, two lengths of which are used and united in front by means of buckskin and sinew threads. A rough network of the latter material fills up the space between the horn and the cap, and is arranged so as to determine the concavity of the latter.

* *ʒɲai* in Carrier, *tɲɔpai* in Tsilkoh'tin.

† Lit. "head-on (minute objects—*i.e.* the shells) are-lying."

Fig. 163.

The cap is formed of two rows of dentalium shells attached to a strip of cariboo skin otherwise secured to the above mentioned netting. A narrow band of leather separates the two rows and serves to retain in juxtaposition the shells whose threads are also passed through it at the proper intervals. The train is of human hair and measures three feet in length. Each strand is formed of about a dozen hairs twisted into a two-ply cord. About one foot from the bottom, bunches of perhaps fifty hairs in their natural condition are added to the end of each strand by means of finely shredded sinew. Moreover, on the outside of the upper part of the train, and forming continuation with the two rows of dentalia of the cap are bunches of four shells of the same description from the united small ends of which hang flaps of artificially curled human hair which add not a little to the general effect of the whole. Altogether, this wig must have produced a striking effect.

The second (fig. 164) is of less complicated design, but of perhaps more costly material. The front horn-like appendage is replaced by fine strips of ermine skin, and the head-covering part is likewise of dentalium shells, of which there are three rows. These are gathered in bunches of three, which are tied at the small end over heavy three-ply cords of human hair terminating on the outside in flaps of curled hair, as in the previous case. The train is composed of fine three-ply strands of human hair adorned, every three inches or so, with two dentalium shells in successive order. To retain these at the proper intervals, little pieces of wood are inserted between the shell and the strand, or the latter is wrapped over with sinew thread. This train is not so abundant in strands, nor quite so long as that of the preceding wig.

These wigs were used in festal dances during which they were decked with swan's down which, owing to the movements of the dancer, produced white undulating clouds intended to add to the picturesqueness of the scene.

They were held in such high estimation, that no consideration whatever could have induced their owner to part with them. The reason of this will be readily understood when it is known that they formed an integral part of the hereditary title of the nobleman. This is so true that they shared with him the traditional name which they were intended to honour. Thus wig, fig. 163, is called *Kahul* after its last possessor, who had himself inherited this name from a long line of ancestors. Therefore parting with them was equivalent to forfeiting one's rank and title. They were handed down from generation to generation, and this explains the air of antiquity and quasi dilapidated condition of those in my possession.

Fig. 164.

The staple material was the hair of notable women. It was clipped after death only, and arranged into the desired style on the occasion of the grand final banquet commemorative of their death and cremation. The hair of two women was required to make one wig.

Even women could aspire to the rank of noble or *t'sèkhèza'*, among the Carriers. On the occasion of ceremonial dances they wore a head-dress even more graceful and pretty in form, if not so imposing and weird in material. This was called *'tast'ju* or "woven-feathers." It was crown-shaped, and its principal component parts were stiff laps of fur skin, generally of the weasel, and feathers. The specimen herewith figured may be described as follows :—A strip of tanned skin about one inch in width and overlaid with three rows of dentalia serves as the foundation or head band of the crown. From this rise broad weasel skin strips with edges folded lengthwise and sewed up inside. These are stiffened by means of large feather quills or slender pieces of wood inserted therein. To further enhance the gracefulness of the head-dress, each skin is kept folded down at the top, thereby converting its tail into a flap. The skin laps are again retained in their upright position by a strip of dressed skin running, on the inside, around the upper periphery of the crown. Scalps of the red-headed woodpecker *(Ceophleus pileatus)* are secured on the folded part of each lap, while the tail feathers of another variety of woodpecker *(Sphyrapicus varius)* are sewn, pointing upwards, on the bottom and the middle of each upright piece of fur skin.

Fig. 165.

This head-dress was filled up, when in use, with down, which the wearer caused to escape around through the jerking of the head peculiar to the feminine style of dancing.

Fig. 166.

The above had been written and fig. 165 drawn for some time when I received specimen pages of a most important Bible Dictionary* now in course of publication in France under the supervision of that learned orientalist, the Abbé Vigouroux, wherein I found the sketch of a Chaldæan king

* *Dictionnaire de la Bible, etc., par F. Vigouroux*, Letouzey et Anè, Paris.

(fig. 166) wearing a headdress so much resembling the 'tast'ɭu that I could not resist the temptation of reproducing it here with the author's permission. This illustration being copied from a contemporaneous monument, offers a very suggestive base of comparison with the ceremonial paraphernalia of our aborigines. Though the crown therein represented must have been of some precious metal, it would seem that the feathers or *'ta* which have given its name to its American counterpart occupy an even more prominent place therein than in the Déné 'tast'ɭu.

The next important piece of the nobleman's ceremonial costume was the *yo-stəthəɟ** or dentalium breast-plate (fig. 167). It had the form of a

Fig. 167. ½ size.

rounded crescent, and this particularity, no less than the costliness of the material, was no doubt intended to indicate the dignity of the wearer. The fitness of the dentalium as a means of ornamentation receives through this breast-plate its best illustration. These shells, as is well known, are larger at one end than at the other, and moreover are also slightly arched. The former peculiarity causes of itself the curve of the two broader rows of dentalia, while the latter likewise renders those of the middle and of the rim well adapted to the shape of the plate. The whole is of course mounted on a ground of dressed caribou skin. Its two clasp like extremities were clasped or knotted with rawhide strings behind the neck.

This article of personal adornment was valued at four dressed moose skins or forty beaver skins which, if estimated at their present price, would represent the sum of $200.

* "Dogwood downwards a-, in point of size," a verb noun

Such was also the commercial valuation of the Raz. This is the ceremonial robe which I have elsewhere compared to the *mehil* of the Jewish high priest. It was originally of tanned cariboo skin, but the specimen in my possession (fig. 168) is of an old-fashioned printed stuff. Yet the fact of its main fringe being ornamented with porcupine quills and here and there with hoofs of yearling cariboo is evidence of respectable antiquity, considering the progressive tendency of the race to which belonged its maker. Exclusive of the lower fringe it measures 2 feet 2½ inches in length, and in its narrowest breadth it is 3 feet 4½ inches. The upper fringe is of red yarn, while that at the edge of the garment

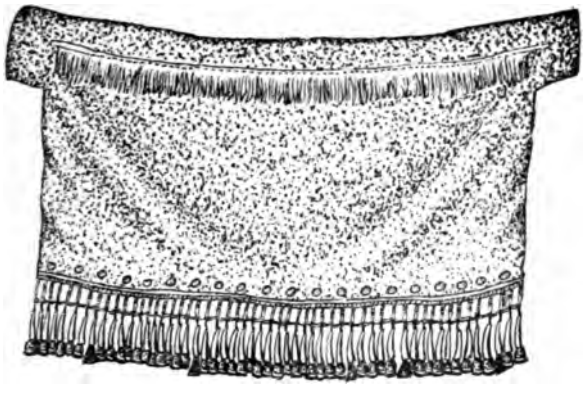


Fig. 168.

Fig. 169.

(fig. 169) is composed as follows:—Firstly, small rounds of red cloth sewn on the printed calico, then two fillets respectively blue and red running along the edge. A narrow strip of tanned skin is then sewed on, from which hangs the fringe proper. The upper part of the strands is wrapped with yellow or green porcupine quills, below which they are left naked until they are connected together at hanging intervals by a slender cord of sinew thread. After an equal length left uncovered, each strand is passed through a dentalium shell, ending in a sewing thimble or a cariboo hoof scalloped at the edge.

The lapels or side extensions at the top of the Raz are intended to button or attach it behind with strings; for though the garment resembled a robe while in actual use, it was put on and worn as an apron from the waist down. Needless to add that the metallic ornaments of

the lower fringe were well calculated to impress the bystanders by the jingling sound they yielded with the importance of the dancer.

The noblewomen wore no Raz, but substituted therefor the cincture-like piece of apparel shown in fig. 170. Though it resembles a girdle, it was considered a breech-cloth. Of course, being merely ornamental, it was worn over the dress. It will be seen that it was almost entirely of dentalium shells without any leather lining.

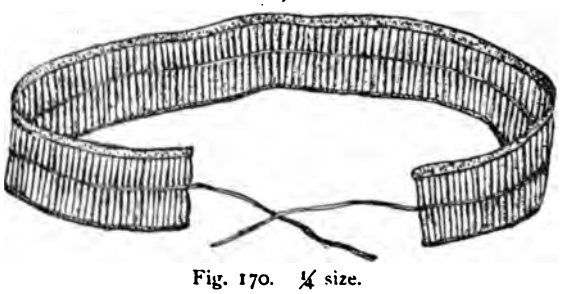


Fig. 170. ¼ size.

Fig. 171.

As a complement to his costume, the təneza· had his ceremonial *Kaonzas* or fire-bag and ornamented quiver. I have never seen any specimen of the latter; but from what we know of the other pieces of festal attire, we may well imagine it glowing as the rest with the ubiquitous dentalium shells and fringes The fire-bag shown above (fig. 171) is mainly of cariboo skin with glass beads stitched on the edges and red and blue trimmings. It belonged to the original possessor of the Raz already described and is therefore contemporaneous therewith. This old man died five or six years ago at the age of 105 years or thereabouts.

The mocassins and leggings were also similarly ornamented on festival occasions. Truly, the Carrier "nobleman," standing in the midst of an admiring assemblage, crowned with the weird head-dress of his ancestors, resplendent in the glory of his moon-like breast-plate, clothed in the folds of his sonorously fringed robe, with his shining fire-bag hanging on the left and his jewelled quiver on the right, and bedecked from head to foot with snow white shells, must have been a sight worth beholding.

This is perhaps the proper place to mention another variety of head-dress which, though ceremonial in intent, was not the appanage of titled

personages. I mean the *shyas-'kei* (grizzly-bear-claws). Its name denotes the nature of its material. These claws are secured to a band of cariboo skin by means of sinew threads passed in a hole bored through their root part. A double row of dentalium shells two lengths between each claw, runs through their upper or slender half, ensuring by means of the sinew thread on which they are mounted solidity for the crown and unity for its component parts.

Fig. 172.

The grizzly bear is the lion of our mountains, and those who presume to wear its spoils thereby lay claim either to supernatural power or to uncommon courage. Such are the medicine men or shamans and a few untitled hunters too proud of their deeds and supposed prowess not to parade them on every available occasion. Such then were the natural possessors of this curious head-dress. I must add that the shamans did not confine their extravagance to the wearing of this crown; the spoils, generally the head, of any other wild beast, the wolf, the coyote (*canis latrans*) the black bear, etc., were also laid under contribution to help to impress the bystanders with the awfulness of the powers they were supposed to be endowed with. But this was only while in the act of practising their occult art.

One peculiarity of the preceding cut cannot fail to strike the reader. It is the mode of wearing the hair therein illustrated. This style was common among the Carriers. When at home, or anywhere when in repose, they had it plaited in a queue resting on the back; but when travelling they found it more convenient to tie it up in a knot behind the neck. Both men and women—except when widowed or in mourning

from some other cause—wore it full length and parted in the middle. Clipping the hair was a token of extreme grief or the badge of forced servitude.

Small tattoo marks will also be observed in the above figure, and not without reason. For tattooing was formerly very prevalent among the Western Dénés. This was not, as among the neighbouring heterogeneous tribes, confined to the chest or the arms and legs, but it extended in every case to the face as well. Various designs were thus indelibly stamped; but the face tattooing consisted more generally of lines, single or parallel, radiating from the mouth corners, on the chin, the cheeks, the forehead and occasionally, the temples. Fig. 173 represents an extreme case. Two women of this place—Stuart's Lake—are thus tattooed. Face tattooing had nothing to do with the totem crest, personal or gentile, of the bearer.

Fig. 173.

When figures were attempted, they consisted of crosses, fishes, birds, fern root diggers, etc., in conventional outlines, all of which will be delineated when I come to treat of the Déné pictography.

The breast was also tattooed, but not so commonly as among the Coast tribes. The figures marked thereon had generally a totemic significance. A much coveted tattoo was the symbol of the grizzly bear (fig. 195) the marking of which cost many a ceremonial banquet and entitled the person thus honoured to exceptional regard.

The forearms, inwardly and outwardly, were more often the seat of tattoo marks. When there situated, these referred as a rule to a personal totemic animal revealed in dream, and the bearing of whose symbol was supposed to create a reciprocal sympathy and a sort of kinship between the totem and the tattooed individual. Sometimes these marks on the arms and legs were intended as a specific against premature weakness of these limbs. In this case, they simply consisted of one or two transversal lines on the forearms or immediately above the ankles which were tattooed on the young man by a pubescent girl. These had about the same significance as the sinew and down wristlets of which mention has already been made.

Tattooing was performed, as among other American tribes, by puncturing the skin with fine bone (or later steel) needles, and by passing underneath a sinew thread coated with crushed charcoal or soot.

The face was also either painted with broad lines of red ochre alternating with black, or the cheeks only were made to receive a coating of rouge. Personal taste and fancy were the only rules followed. Young persons were also fond of trimming their eye-brows to a diminutive width, after which they blackened them with charcoal.

CHAPTER XI.

HABITATIONS.

It has already been stated that of the three tribes under consideration two, the Carrier and the Tsi[Koh'tin, were semi-sedentary, while the other, the Tsé'kéhne, was entirely nomadic. Consequent upon this different social status was, of course, the nature and style of the habitations proper to each. Thus the Carriers, whose social system was very elaborate and whose staple food was salmon, had formerly no less than five distinct kinds of dwellings, the ceremonial lodge, the summer lodge, the fishing lodge, the winter lodge, and, among the southern half of the tribe, the subterranean hut.

In common with the coast tribes whose social organization they had largely copied, the Carriers had formerly, as well as now, regular villages which they inhabited but part of the year. But while the former chose the winter months to enjoy the sweets of home life, the latter were never to be seen in their permanent dwellings except during the fair season. This may easily be accounted for when we remember the differences of climate. The coast owes to its proximity to the ocean the comparatively mild, if damp, weather it constantly enjoys, while east of the coast range of mountains, the winters are usually very severe. Now, as among the inland tribes, nobody, however wealthy, sleeps in more than one blanket, a large fire is kept in the lodge day and night, and so the amount of dry wood available in one place is soon exhausted. Since they are possessed of carrying conveniences unknown in olden times, this necessity of shifting one's abode from place to place is not so much felt. But formerly with their limited facilities for felling trees and bringing the wood home, they had to change every year their winter quarters.

The permanent village was thus inhabited only during the fair season, that is from the first week in May, when the grebes arrive, until the second week of September, after the family supply of salmon has been secured. The villages are generally situated at the confluence of rivers, or on the northern banks of lakes, so as to have the benefit of the sun's rays from the opposite side. In any case, the location is chosen in such spots as seem to promise the greatest fishing facilities. They were formerly composed of the ceremonial and the common summer lodges. As these differ in plan and material from those illustrated or described by writers on the coast Indians, I feel justified in giving herewith plans and explicative details of both.

And first as to the ceremonial lodge (fig. 174). It is so called from its being the seat of all large native gatherings, such as festival banquets, distributions, dances, etc. It serves at the same time as the dwelling

Fig. 174.

house of the nobleman to whom it belongs and of such co-gentile families as it can contain. Its erection was the occasion of great festivities and necessitated the accumulation by the future proprietor of

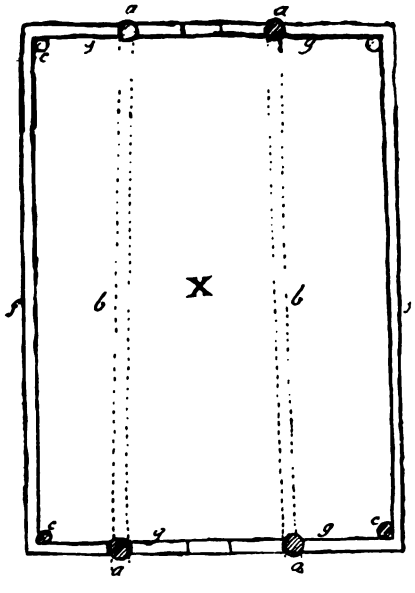


Fig. 175.

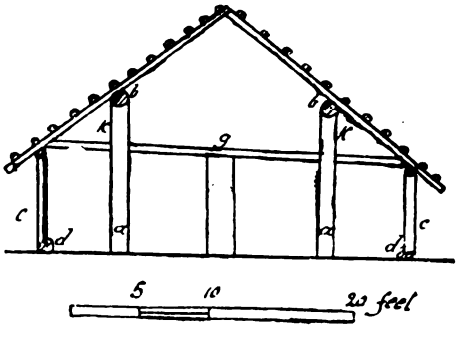


Fig. 176.

large quantities of eatables and dressed skins. Following step by step the progress of its building, which was diversified, as on the coast, by intervals of merry-making and feasting, we will proceed to a brief

description of the lodge, the ground plan and front end of which will be found in figs. 175 and 176.

The main timbers of the building consist of the posts *a* and the beams *b*, placed so as to form a parallelogram. The former are of spruce of as large dimensions as can be found. After they have been cut to the required length, they are hauled on skids to the place of construction. Let me say here that as these posts—four in number—are the mainstay of the house, they are regarded by the natives with feelings akin to reverence which are furthermore excused by the circumstance of the totem animal of the proprietor being generally carved in relief not far from their upper end *k*. For this reason, the place of honour is at their base and, in ceremonial gatherings, the noblemen were invariably seated against them, surrounded by their co-gentile suite.

After the logs had been stripped of their bark, they were rendered as smooth-surfaced as possible by means of repeated scrapings. When standing in position, their longitudinal half was made to jut out of the plank wall. Not uncommonly, they were also painted with red ochre, when a mash of carp roe served as oil and was smeared over the posts so as to prepare a sticking surface for the colouring matter. As a precaution against too early decay, the butt end of each was wrapped around with birch bark prior to its being covered up with earth.

The head of these four posts or pillars is hollowed to receive two large cylindrical beams or plates, *b*, which are cut a little longer than the length of the future lodge, so as to let their ends project in front. Four secondary posts of smaller size, *c*, are next erected on the outside of the parallelogram at equal distance from the first and form the corners of the house. They likewise support on hollowed ends two smaller plates, *f*, over which the eaves of the roof are to rest. The ends of two transversal beams of moderate dimensions, *g*, the object of which is to further solidify the structure and especially the gable walls, are then laid in a notch cut out on these minor plates. The foregoing pieces constitute the frame of the building.

Once they are in place, the erection of the roof is proceeded with As this is even to-day constructed on the same principle as formerly, it deserves special mention. The rafters, *h*, are secured together at the top of the roof by means of *'kən* or wattle of high cranberry bush *(Viburnum pauciflorum)* passed through holes pierced in the proper places. Over these are tied with willow bark, at intervals of one or two feet purlines which are then covered with spruce bark. This is secured in place principally by means of additional rafters laid over it and pressed down

by a long beam to which their lower extremities are attached (see fig. 174). As a further guarantee of solidity, slender poles are finally inserted between the bark roofing and the outside rafters. Of course an aperture is left open in the top of the roof for the smoke to escape.

There now remain the walls to construct. They consist of hewn slabs of spruce which were formerly shaved on the outside as smooth as the working tools then available permitted. The lower end of these rude planks was introduced in a channelling prepared therefor in the large beams, *d*, lying on the ground, while their upper end was engaged between additional poles running under the eaves or along each side of the gable.

Large lodges had generally two entrances, one at each gable end of the building. Their lintel was formed by the transversal, beams, *f*, and they were shut by regular board doors as is practised to-day. However, I have seen a ceremonial lodge whose doorways were simply cut in the end walls some distance above the ground, and were elliptical, as marked in outline in fig. 176. Such lodges were called *horwə-ltaz-yə*R, or "house with cuts through."

There never were any windows in the old style lodges. Full ventilation was however established through the doors, the smoke hole and the numerous wall chinks consequent on the sinking in of the boards.

The fire-place was in the centre of the building, and fire was made immediately on the floorless ground. Only two or three stones served as andirons for the wood to lie upon. The family meat or fish was, and is still, commonly either roasted by means of a wooden spit passed therein and stuck in the ground near the fire, or boiled in a kettle supported over the flames through a long stick likewise driven in the ground at a distance from the fire.

No shutter was used in connection with the smoke-hole as is done among the Haida, nor was the floor covered with any boards.

The sleeping places only were strewn with spruce branches and undressed skins, over which everyone stretched himself in his blanket with most of his clothes on. All had their feet next to the fireplace, instead of each married person having them at the head of his or her partner, as is common among the Blackfeet,* and the Eskimo.†

* Legal, *Les Indiens dans les plaines de l' Amèrique du Nord, Petites Annales O.M.I.*, Paris, 1891.

† After Rod. MacFarlane, Esq., who has passed several years among those aborigines.

There was in the lodge no partition whatever.

Sometimes related families found themselves too numerous to dwell all under one roof. Rather than cohabit with people of a different gens, they would then build for themselves the smaller summer lodge (fig. 177). Quite a number of these old fashioned buildings are still extant. They differ considerably from the large ceremonial lodge: instead of four *ĥnyəs-tcən* or principal upright posts, they have only two, one in the middle of each gable end. To facilitate the semi-circular hollowing of their upper

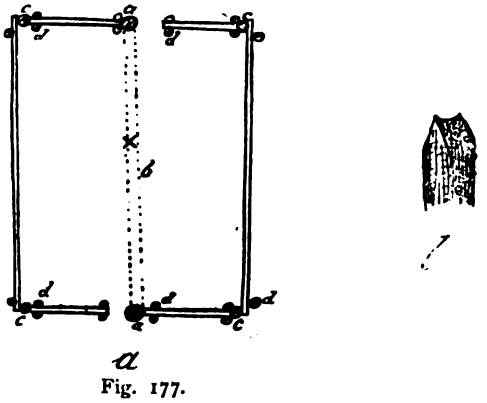


Fig. 177.

ends, these are previously thinned on each opposite side into a tapering edge (fig. 177 *b*). Four *ĥnyəs-səl* or secondary uprights, *c*, stand in the corners of the lodge. As the walls are to be superimposed poles, minor posts or stakes, *d*, are planted in the ground in pairs on each side of the wall whenever this is necessary to prevent the latter from tumbling down. After the posts of the walls have been inserted between the two opposite posts they are furthermore secured thereto, three or four together, by means of willow bark ropes. Such unimportant habitations have indifferently one or two entrances, generally without any door. Their apex is formed as in the preceding case by the transversal piece, *e*, which rests on each end of the eaves-plate. When two doorways exist, one will be on the right, the other on the left, of the main upright post in the middle.

The roof is in every respect similar to that of the ceremonial lodge. Speaking of the latter, I failed to mention that the eaves project a considerable distance from the walls.

A few ceremonial lodges were also built on the same plan as the minor dwelling houses. Their material was identical, save that instead of poles hewn planks formed the walls. In that case the totem crest was carved out of the protruding end of the top plate (fig. 188). A few even had

only one door. The place of honour was then just opposite the door, as among the Blackfeet.*

Another variety of Carrier dwelling which is inhabited only during *thal-lo-ñrən*, or the salmon season, is the fishing lodge. In general appearance it resembles the summer dwelling lodge just described, but is, if possible, more rudely constructed. Its ground plan is identical, but it wants the gable end walls above the transversal beams. The large openings consequent thereupon leave free access to the wind and air and thus accelerate the drying of the fish which are suspended on cross poles resting transversely on the top sticks of the side walls. By exception, a few of these lodges have the apex of their front adorned with the carved totem crest of the proprietor. It may be remarked that these fishing lodges are not mere sheds for the exclusive destination of smoking and curing fish; they serve also as dwellings for the fishermen during the whole space of time that they are used.

We now come to the winter lodge of the Carriers. We have already seen that, at least among the upper Carriers, new winter quarters were chosen every year in such spots of the forest as promised to yield the best supply of firewood. These habitations were therefore of a merely temporary nature. Yet they were carefully built, the greatest attention being always paid to the comforts of those about to winter therein. They were original in construction, and deserve a full description.

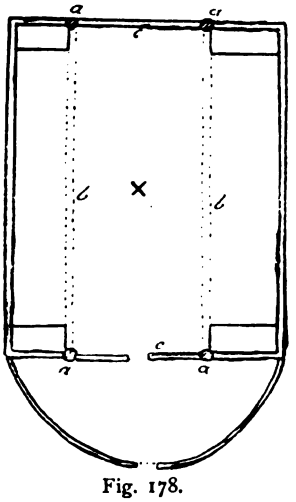


Fig. 178.

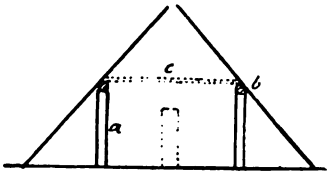


Fig. 179.

Four *ŧnyəstcən* or posts of moderate size with hollowed upper ends were planted in the ground and supported the usual longitudinal plates.

* Legal, *uti suprà*.

On these parallel plates split poles of spruce or cotton wood were made to recline in a slanting position so as to form a roof without walls, the split side resting immediately on the beams. To ensure additional solidity, the lower end of each stick was slightly driven in the ground, or covered up with earth. The middle ones were purposely shorter, so as to form a smoke hole in the top. A covering of spruce bark was then added, each piece of which was steadied by means of independent sticks resting thereon.

There now remained the gable ends. As with the other styles of native buildings, a *thapa-sə'a* or transversal beam (*c* of fig. 179) was laid on the side plate, *b*. Slender posts or stakes were next planted on the same plan in an upright position to fill in the end of the lodge opposite to the front. Fascines of spruce boughs or saplings were moreover laid against this wall on the outside, and all possible interstices were carefully chinked up by forcing in shoots of conifers.

The front end was more complicated. As comfort and warmth were the chief aims of the builders, the structure had but one entrance. This was obtained by introducing immediately under the apex of the gable down to the transversal plate a broad slab of spruce securely wedged between the wall posts or stakes driven in the ground. The aperture left free underneath constituted the doorway. This was shut by an independent board just a shade narrower, so as to move easily. It was suspended by means of a stout rope, and to go in or come out you need only push it ahead of you ; its own weight would cause it to return to its original perpendicular position, and thus only a minimum of cold air would steal in the building. As a further precaution against the inclemency of the season, the front end of the lodge was provided with a semi-circular door-yard with an additional door. This sort of native *atrium* resulted from a number of heavy poles or posts being made to rest at their small end on the gable wall, while their lower extremity described a half circle on the ground. The whole was then covered with brush. The outer doorway was shut with some worthless skin with the hair on, while the ground within the enclosure was strewn over with small branches of conifers, generally spruce. This enclosure, besides contributing to render the hut warmer, served also as a kennel for the dogs and as a bathroom for the old men. Its native name was *pən-tsiʃ* (a word of the third category of nouns).

In the ground plan, fig. 178, the space between the uprights and the corners of the lodge is purposely partitioned off. It forms what was known as the *'kûnt'ʃat tsatcən* or corner store, the sides of which consisted mainly of roughly hewn boards set up to the height of three or

four feet. Therein the family impedimenta were stowed away, and the number of such depositories generally corresponded to that of the cohabiting families.

A totally different style of winter dwellings obtained among the Tsi|Koh'tin and, through them, among the Lower Carriers. This was the *tɥizKɔn* or semi-subterranean hut. It had been borrowed from the two tribes' neighbours in the south and southeast, the Shushwap. Dr. F. Boas has already given * the plan and description of one which is probably of a representative character, while more lately Dr. G. M. Dawson has furnished us † with an example of a different style observed by himself among the Shushwap. None of these however tallies in point of construction with the *tɥizKɔn* of the Lower Carriers such as it existed among them some forty years ago. From information gathered from an eye-witness, I am enabled to give the following account of those constructed at Fraser Lake and Stony-Creek.

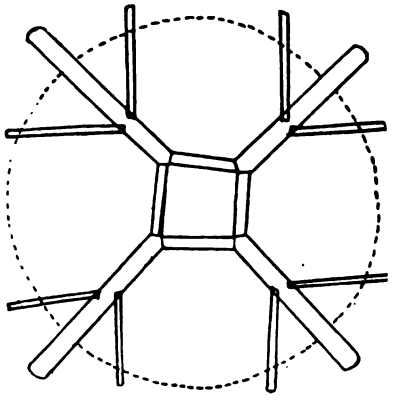


Fig. 180.

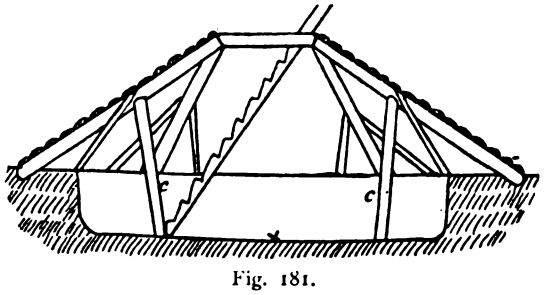


Fig. 181.

After an excavation some three feet deep and about 20 feet in diameter had been made, the butt ends of four large beams were made to rest a

* Sixth Report on the N.W. Tribes of Canada, figs. 20 and 21, Leeds Meeting B.A.A.S. 1890.

† Notes on the Shushwap People of B.C.; Trans. R.S.C. Sect. II., fig. 1, 1891.

little distance from the brim, on the original surface of the ground, while the beams converged with their small ends raised five feet or thereabouts to a point above the excavation, which was to become the door and smoke hole of the hut. These timbers were held up by means of four short pieces of wood, the end corners of which were wedged or locked in those of the larger beams, as shown in fig. 180. The aerial square orifice resulting from this combination was the doorway of the building. No other timbers were added to this frame-work, save that to further solidify the structure, two, or in larger huts, three, stout posts, *c*, forming a right angle with the main beams were planted in the floor with their upper ends notched in the beams, over which split poles were laid horizontally up to the top or rather the door.* This roof was then covered with earth. An Indian ladder—that is, a log notched at the proper stepping intervals—was the means of communication with the outside.

These huts were very comfortable, and but little fire was needed to keep them warm. From the Tsiǀkoh'tin names of the months we learn that they were occupied from October-November, but how long cannot be ascertained from that source. If we are to judge from a myth current among the same tribe, it would seem that these subterranean dwellings were, in olden times, spring as well as winter homes, since they are mentioned therein as being inhabited as long as the root digging season

The habitations of the Tsé'kéhne, whether in winter or in summer, are built after the eastern or conical model. Four long poles with forking extremities are set up one against another, the lower ends of which form on the ground a square on the dimensions of which will depend the size of the lodge. A score or so of other poles are then set up in a circle. the top of each resting on the point of intersection of the first four. In winter, small fascines of spruce are laid horizontally all around the lower perimeter of this frame, so as to leave as few points of access as possible for the cold air from underneath the outer covering, which is then wrapped around the cone resulting from the converging poles. This covering consists of dressed moose skins sewn together, and its perpendicular edges correspond to the entrance of the lodge. They are either buttoned or clasped together from four or five feet above the ground up to the top. On one side of the opening thereby produced is sewn a smaller skin, which forms the door. Two sticks attached transversely thereto on the inside give it the requisite consistency, while the upper one, which slightly projects beyond the edge of the skin door, serves as a latch, its projecting

* As shown in the accompanying cuts, minor logs were however added to the main timbers, so as to facilitate the roofing of the hut.

end being, when necessary, fastened with a string to the adjoining part of the lodge covering. The smoke escapes through the interstices between the converging poles left uncovered at the top. To guard against snow, rain or adverse winds, an additional piece of skin is sewn on the outside from the apex of the conical covering down to some distance, while its free side is secured to a long pole planted in the ground close by. This appendage is utilized as a shutter wherewith the top opening of the lodge is partially or entirely covered, as the state of the weather may suggest.

The summer lodge of the Tsé'kéhne has sometimes two entrances, and in this case the outward covering generally consists simply of two blankets or skins stretched over the frame poles, one between each door. The upper half of the cone is thus left uncovered.

Summer and winter, the fire is started right in the centre and, instead of the wooden tripod used among the Blackfeet to suspend their kettles,* the Tsé'kéhne prefer a stick reaching horizontally at the proper distance above the fire to two opposite poles of the frame to which it is fastened.

Carriers, Tsi|Koh'tin and Tsé'kéhne, nowadays more generally use, during their summer travellings, either cotton tents, or shelters composed of three or four sticks thrust slantingly in the ground, over which a sheet of cotton or canvas is spread. The latter style of shelter was probably the only one known among them prior to the introduction of European textile fabrics, save that, of course, a moose skin replaced the canvas or cotton sheet.

Of course the child of the forest, when in his primitive state, can boast the possession of no artificial means of reckoning time or measuring long distances. But Dame Nature provides him with a seldom failing standard measure in the shape of the sun, the course of which is familiar to him, no matter how far he may have swerved from beaten paths. Long distances are determined by the number of camps, and shorter ones by the position of the sun in the heavens. The sun serves also as his watch by daytime, and its bearings are easily taken in by the native mind. After it has left his pine-clad mountains to illuminate unknown worlds, the aborigine again looks up above to ascertain how long he will be deprived of its beneficent rays. The Great Bear then becomes to him the hands of a God given clock, and the distance it has travelled around its axis, the polar star, over the dial which we call the heavens, is very seldom, if ever, misreckoned. The Western Dénés are familiar with a few constellations which are, as among us, called after mythic personages; but none is

*Rev. E. Legal, *loco citato.*

so widely known as *Yihta*, the Great Bear. We have already seen the role it plays in the story of the Gambler; I must be pardoned for reproducing here another legend wherein it is to be recognized under a different garb, but playing a no less important part. As will soon appear, if fable it is, sociologically speaking, it is a fable with a moral.

"There was a young man who was impatiently awating the return of daylight to set out on a hunting expedition. Again and again he would look up at Yihta, and in his impatience he exclaimed: 'That old Yihta,* how slowly he walks!' Very soon after having uttered these words, he left for the chase.

"He had not gone far before he became aware by the barking of his dogs that they had scented game. After what appeared to him as a run of but a few moments, he overtook his dogs, and lo! sitting on a log was a man of beautiful countenance, carefully painted in red stripes over the cheeks, and holding a walking stick in his hands. He had a malicious smile on his face, so that the young man felt abashed in his presence and afraid to approach him. 'Come on,' said the stranger who was no other than Yihta, 'come on, young man. So you laugh at me and say that I walk too slow? Now learn that to reach me you have travelled a very long distance, since to help you I have contracted the surface of the earth. Go back then to your home, and take this staff to aid you on your long journey. Whenever you want food, hold it perpendicularly on the ground, then drop it and observe the direction in which it falls: if it falls in the direction of the northern wind, do not go that way, for there famine is awaiting you. If it falls towards the setting sun or towards the rising sun, go either way and you will find bears to kill, both male and female. Do likewise when you feel uncertain as to the direction of your house; and when you get home, hang the staff up in the branches of a tree. Above all, beware lest a woman having her menses catch sight of it.'

"At these words, the young man took the walking stick without however giving much credence to the stranger, for he believed his home was but a short distance from where he stood. Yet these words were literally fulfilled, and during his long peregrinations, amidst incessant fatigues and ever recurring privations, the young man owed his life to his careful observance of the stranger's directions. Many were the years he travelled, and he seemed to get a glimpse of his lodge several days before he really reached it. When he finally got home, he was an old man with hair white as snow, and his lodge was crumbling down through age and decay."

---

* *Ntən Yihta'qəl!* Expre-sive of scorn.

From this short Carrier myth, the sociologist will learn that:—Firstly, the observation of the Great Bear as a means of reckoning time was a national custom among Carriers. Secondly, the heavenly bodies were regarded as quasi divine powers which it is wrong to speak lightly of, a deduction which might easily be proven to be legitimate by other points of Carrier psychology. Thirdly, to look handsome, a Carrier of the old stock must paint his face. Fourthly, the Carriers had a correct idea of the immensity of the universe. Fifthly, the injunction not to travel in a northern direction might perhaps be interpreted as a reminiscence of the tribe's migrations southwards. Sixthly, a woman having her menses is legally impure, and must be deprived even of the sight of any object endowed with magic powers. Lastly, more than one of those writers who are so fond of parallelisms between American mythologies and the Biblical narrative will no doubt be tempted to compare the beneficial, food-giving and road-finding staff of the young traveller with the marvellous miracle working wand of Moses which, during similarly life-long peregrinations, opened the way and found water where none was to be seen. This suggestion, however, is given for what it may be worth, and I must leave it to others to decide whether it is not too far fetched.*

Now that we have extracted *morals* enough from our fable, we revert to the description of the few items which still claim our attention.

If my information is reliable, there were formerly no fortified villages among the Western Dénés. One should not however infer from this that there was no warring among them; on the contrary, I think I am warranted in stating that atonement by compensation for losses of life, even involuntary or accidental, was much less practised here than on the Coast. But hostilities were seldom of so general a character as to involve whole villages, though some such cases are recorded in the traditions of the tribes. More commonly they were restricted to two different gentes, and their cause may have been the killing of a man openly or, as was supposed, through the black art of the shamans. In the latter case, the dying person usually revealed the name of the magician to whom he attributed his death, and nobody dreamt of questioning the truth of his would-be revelation. Naturally, more than once personal grievances must have been thus avenged. The cognate families of the real or fancied murderer would then expect reprisals at the hands of the co-gentile families of the deceased, and they would erect, generally in secluded spots of the forest, what was called *pəR-pa-yəR* or "a house for

* The Tsi|Koh'tin possess a different tradition, the principle hero of which works innumerable marvels with the help of a magic wand which they call *'toR*, a word not employed to designate any other kind of wand or staff.

the war." This primitive fort consisted of a log-house as solid as possible under the circumstances, with a strong log roofing, over which a square breastwork of small diameter was built with the same material. If not taken by surprise, the besieged shot at their assailants through loop-holes pierced in this rude stronghold, the existence of which was concealed by fascines of coniferous branches piled on the roof up to the top of its walls. Similar portholes were also cut in the walls of the house itself for service in case of a sudden attack. As a further protection against such a contingency, an addition with a second door was always made to the front end of the house. Frequently a building similar in appearance, but really of no strength whatever, was erected in close proximity so as to deceive the enemy and give time during an attack on the wrong work to the besieged to prepare for the defence. The only Déné "fort" I have ever seen was constructed just as described, but wanted the roof breastwork.

An indispensable adjunct to the native dwelling house is the *tsa-tcən** or provision store. There is stowed away the dried salmon, which is the daily bread of both Carrier and Tsi|Koh'tin. But while both tribes practically live on the same diet, their store houses very materially differ in construction. Fig. 182 is the Carrier tsa-tcən which, as may be seen, is an aerial building. The distinctive characteristics of all these provision stores are faithfully reproduced in the cut; but their minor details nowadays vary not a little. I have chosen for illustration that which approaches nearer to the traditional type. It consists of two parallel frames planted upright in the ground, the component parts of which are furnished in the middle with transversal beams upon which rests the floor of the tsa-tcən proper. With the exception of the front end, the whole is made of heavy poles superposed one upon another or laid in close juxtaposition, as the case may be, and fastened to the frame of the building by means of *k'on* or high cranberry bush wattle. The front end is entirely of boards. All the wall poles being laid with their larger ends in the same direction, a slight inclination results at the top, which constitutes the roof of the building. This is furthermore covered with spruce bark.

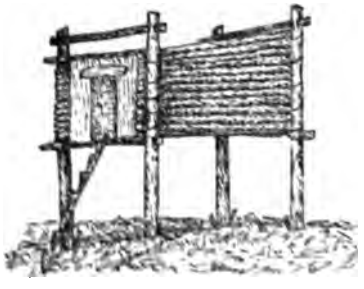


Fig. 182.

* Literally: "beaver-stick." I can see no reason for this etymology.

The tsa-tcən of the Tsi|Koh'tin are not so elaborate, since they are nothing else than small and very rude, though solid, log huts built right on the ground (fig. 183) and, as a rule, quite a distance from the regular village, while their Carrier counterparts are generally very close to the habitations.

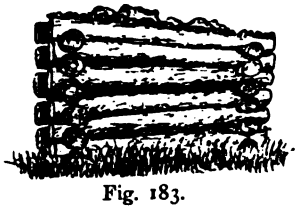


Fig. 183.

The Tsé'kéhne have nothing to do with salmon, and consequently the need of provision stores is not so urgent among them. Yet when they happen to be blessed with an abundance of dried meat and wish to preserve it for future use they erect sorts of scaffoldings immediately against the trunk of a tall tree which are to them the equivalent of the Carrier tsa-tcən. These consist of two long, heavy sticks crossed and firmly bound to the trunk of the tree at their point of intersection, while their ends are secured to some stout overhanging branch by means of strong ropes. Rough boards or split sticks are then laid across this frame which form a floor over which the meat or any other eatable is deposited, carefully wrapped over with skins or spruce bark. Even the bear cannot get at those *caches* without previously demolishing their floor, which is practically impossible.

The careful observer who would take a fancy to travelling along our chief salmon streams could not fail to notice, in some spots immediately over the banks, numerous excavations or pits which betray an artificial origin. These are all that remain to-day of the salmon cellars of the prehistoric Carriers. Aerial stores were then as now the regular family larders; but not unfrequently the natives of the old stock preferred to cache down their fish in temporary cellars which had the advantage of keeping it fresher than the common store-house. A matter of taste as regards the salmon itself, this caching down in the ground became a necessity relatively to its roe, which was buried, wrapped in spruce bark, until it had reached an advanced stage of putrefaction, when it was relished by the native palate as the *ne plus ultra* of delicacy.

The last item more or less connected with aboriginal habitations is the sweat-house or sweating-booth.* According to Dr. G. M. Dawson, this usually consists, among the Shushwap, "of about a dozen thin willow wands, planted in the ground at both ends. Half of them run at right angles to the other half, and they are tied together at each intersection. Over these a blanket or skin is usually spread, but I have also seen them covered with earth. A small heap of hot stones is piled in the centre,

* *Tsé-zil*, "stone-hot," a word of the third category.

and upon these, after carefully closing the apertures, the occupant porsu some water. The sweat-house is always situated on the banks of a stream or lake, so that on issuing therefrom the bather may at once plunge in the cold water." * One single point—and that a very unimportant one—differentiates the sudatories of the Carriers from those of the Shushwap: I mean the covering, which among the former is of spruce bark. Here, as further south, these sweat-houses are invariably to be found near a stream or lake; but the reason of this is merely that our Indians never dwell away from the water, for I have never heard of a Carrier taking a cold bath immediately after his steam bath. It may also be worth mentioning that, more often than otherwise, steam-bathing was originally practised for quite other than sanitary motives. It was quite commonly prompted by a desire on the part of the "patient" to ensure success during a forthcoming hunting or trapping tour, or to atone through this penitential act, for any transgression, wilful or involuntary, against the traditional laws and customs of the tribe.

* Notes on the Shushwap People of British Columbia; Trans. R.S.C. Sect. II., 1891, P. 9.

CHAPTER XII.

MONUMENTS AND PICTOGRAPHY.

A search for "monuments" among such a primitive people as the Déné cannot be but unproductive of satisfactory results. Indeed, throughout the whole territory of both the Tsi|Koh'tin and the Tsé'kéhne, not a single work is now extant which could, with any degree of appropriateness, be classed under that head. Even such as may now be seen among the Carriers are—barring funeral monuments—exceedingly scarce. All of them may be reduced to two distinct categories: wooden, carved monuments, and painted or drawn monuments. Hence the two divisions of this chapter: carved monuments and pictography.

CARVED MONUMENTS.

Genuine carved monuments are to-day very few, and seem to have always been so among the Carriers. Indeed so scarce are they that every one of those now extant will easily be illustrated herewith. I shall pass over the totemic columns of the Hwotso'ten which are still in a good state of preservation, for the reason that their carving and erection were the work of their exogenous neighbours, the Kitikson, whose nearer village stands hardly three miles off. Those monuments are merely witnesses to the influence exercised by outsiders over a very unartistic race, and the custom of erecting them had not been adopted by the main bulk of the Carrier tribe. This cannot be said of the famous commemorative mortuary columns so common all over the North Pacific Coast, and which had been appropriated as far inland as the boundaries of the Tsé'kéhne territory. All of these have long disappeared, with the exception of the two herewith represented, which I sketched ten years ago at ⌐rak, a village site among the Nutca'tenne, the population of which is now extinct. These columns are a further corroborative evidence of my thesis, viz., that the Déné race has no eye for the beautiful. Compared with those of the Coast Indians, they stand in the relation of an undeveloped embryo to the matured being. As is well known among Americanists, such works served as depositories for the few remaining charred bones of the deceased, and were erected in close proximity to the village. The two specimens figured below are rather plainer than the average mortuary column of the Carriers since, according to my informants, the totem crest of the deceased was generally carved in

relief thereon. These monuments were, as a rule, grouped according to the different clans obtaining among the tribe. This arrangement has survived in the column fig. 185, which now stands at Fort Babine in the

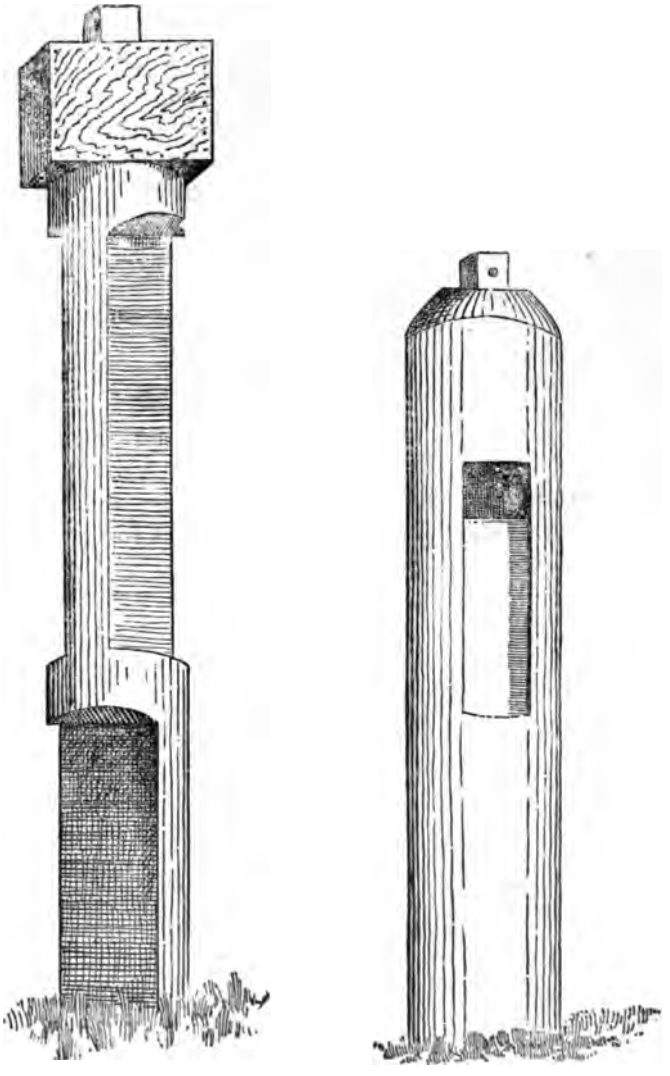


Fig. 184.

midst of the graves of *Tsa-yu-ne*, one of the native gentes, the chief totem of which is the beaver. It was, of course, erected in pre-Christian times. Such is also the case with regard to the grave shown in fig. 186,

whose occupant was likewise a fellow of the Beaver clan. His grave is to be found at *Tsé-tcah*, on the confines of the Hwo-to'tin territory.*

Fig. 185.

Fig. 186.

In fig. 187 the totem crest of the old days has been replaced by the Christian symbol which now appears over all the native Déné graves. These monuments affect a multitude of forms and designs, though by

Fig. 187.

far the greatest number of them resemble, in a general way, that herewith illustrated. It is over a late grave, and is painted in several gaudy

* See the map affixed to my paper; Are the Carrier Sociology and Mythology indigenous etc.? Trans. R.S.C. Sect. II., 1892.

colours, the severity of the black and white of the rubrics being repugnant to the native taste which sees in such works no monuments of grief or sorrow, but rather affectionate tributes to the memory of the dead which it behooves one to make as showy as possible. This explains why some of them are so absurdly large, sometimes graves, even of children, being covered with "monuments" affecting the shape, and almost the dimensions, of rectangular cart-sheds.

To the above let us add the wooden totem crest ornamenting two native houses and we will have the sum total of all the carvings now to be seen throughout the whole territory of the Tsi[Koh'tin, the Carriers and the Tsé'kéhne. Of these sculptures, the first only (fig. 188) can

Fig. 188.

boast a few scores of years. It represents a raven standing over the head of some marine animal—possibly the orca. The reason of this incongruous coupling may probably be seen in the fact that the inhabitants of the place wherein the totems are to be found are of mixed parentage, as they have considerably intermarried with their western neighbours, the Bilqula. The last carving (fig. 189) is quite modern. The owl thereby represented has been carved out of a balsam poplar tree (*Populus balsamifera*) and adorns the front gable end of a fishing shanty at the outlet of Lake Stuart.

References to the totems and gentes of the Western Dénés have been frequent in the course of this monograph, and, especially in view of what remains to be said in the latter part of this chapter, some more detailed information concerning them may be found acceptable.

F. G. Frazer, the principal authority on Totemism, says: "Considered in relation to men, totems are of at least three kinds: (1) The clan totem, common to a whole clan, and passing by inheritance from generation to generation; (2) the sex totem . . . ; (3) the individual totem, belonging to a single individual and not passing to his descendants."*

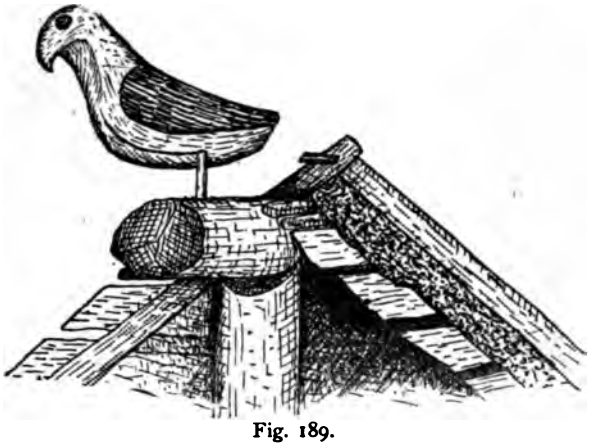


Fig. 189.

Of the sex totem I know practically nothing, as it does not obtain among our Indians; but to these three varieties of totem I can add a fourth, which I shall call the honorific totem, and of which a full explanation will be found further on. The individual or personal totem is well known as being some material object or being, most generally some animal, ordinarily revealed in dreams to a person who is bound thereafter to look upon it as sacred and to be especially revered and protected. In return for this reverence on the part of the person, the totem is believed to particularly help and powerfully protect its human relative, as the individual is supposed to be. As for the clan totem, any reader of Americana is too familiar with it to be in need of any definition or explanation. One totem generally—though not always—corresponds to one clan or gens, so that the former and the latter are very often in equal numbers. Four gentes obtain among the Carriers, of all which I herewith submit the native names together with those of their respective totems.

GENTES.	TOTEMS.
Ɂt'səməc-yu.	The Grouse.
Tsa-yu.	The Beaver.
Yəsîl-yu.	The Toad.
Təm'ten-yu.	The Grizzly Bear.†

* Totemism, Edinburgh, 1887, p. 1.

† Judging from fig. 188, it would seem that the crow or raven is regarded as the totem of some clan among the Lower Carriers. It is not known here in that capacity.

With the exception of Tsa-yu, which means "Beaver-medicine," those words are untranslatable and are probably imported from among the heterogeneous tribes from which the whole system is undoubtedly derived. The first gens, ʔt'səməc-yu, is by all odds the most powerful among the Carriers, while the two last named are considered as having a sort of affinity which entitles the members of each to mutual consideration and protection. The name of the latter, Təm'ten-yu in Babine, is changed to *Kwən-pa-hwo'tenne* * among the Carriers proper.

In great native festivals, the totem of the celebrating clan was carved and exposed at the door of the lodge so that every exogentile incomer may have an opportunity of presenting it with anything of value which he may intend for the givers of the feast with the tacit, but well-known, understanding that it be subsequently paid for by a donation of at least equal worth. Even the public naming of one's gentile totem by a member of a different clan demanded the gift of a blanket, a piece of dressed skin, or any article of wearing apparel, so that the crest may not remain ignored and the whole gens thereby dishonoured.

An important sociological peculiarity which I have nowhere else noted claims attention in this connection. The clan totem is called *nətsi* in Carrier. But beside the nətsi there existed here another kind of totem which I have named the "honorific totem." It was personal and did not pass to one's descendants, though it differed from that revealed in dreams. Its native name was *shən-'koh*, a compound word which may be freely translated by "rite." It was voluntarily assumed with an accompaniment of befitting ceremonies by any titled or untitled individual who wished to advance in social standing. It entitled the owner to special consideration, though the latter could on that account lay claim to the possession of no hunting grounds nor to the exalted rank which was the strict property of the "noblemen" or *təneza'*. In a word, those honorific totems created a sort of middle class, the *bourgeoisie* of the Carriers. They were many and varied, and, with the exception of one, they followed the clan in such a way that those proper to one could not be assumed by a member of another. Here are those now remembered by the natives :—

To the ʔt'səməc-yu belonged the Owl, the Moose, the Full Moon, the Weasel, the Wind, the Crane, the Wolf, the "Darding Knife," the "Rain of Stones," and the Brook Trout.

Of those pertaining to the Tsayu or Beaver gens, only the Mountain Goat is now remembered.

* "Inhabitants of the fireside."

The Yəsîlyu had the Sturgeon, the Arrow, the Porcupine, the Wolverine, the Red-headed Woodpecker, the Cattle and the *Təlt'sá*, a kind of fabulous animal resembling a gigantic toad, with large, bulging eyes.

My informants know of only the Goose as belonging to the Təm'tenyu clan.

Another honorific totem or crest was called *Sənnaɂ*, a word of extraneous origin. The exact nature of this cannot now be defined, as the mimicking accompanying its exhibition is but vaguely remembered. All that is known for certain is that it was very highly appreciated and, as a rule, it was the appanage of the notables exclusively. For here I must remark that even the notables or noblemen were not debarred from assuming one or more of the different honour crests proper to their gens.

Luɟem is another word of forigin origin which designated the Bear as an honorific totem.* It could be assumed by anybody, irrespective of clannish differences.

The connection of the individual with his crest appeared more especially during ceremonial dances, when the former, attired, if possible, with the spoils of the latter, was wont to personate it in the gaze of an admiring assemblage. On all such occasions, man and totem were also called by the same name. The adoption of any such "rite" or crest, was usually accompanied by initiatory ceremonies or observances corresponding to the nature of the crest, followed in all cases by a distribution of clothes to all present. Thus whenever anybody resolved upon getting received as Luɟem or Bear, he would, regardless of the season, divest himself of all his wearing apparel and don a bear skin, whereupon he would dash into the woods there to remain for the space of three or four days and nights in deference to the wonts of his intended totem animal. Every night a party of his fellow-villagers would sally out in search of the missing "bear." To their loud calls: *Yi! Kəluɟem!*† he would answer by angry growls in imitation of the bear. The searching party making for the spot where he had been heard, would find by a second call followed by a similar answer that he had dexterously shifted to some opposite quarter in the forest. As a rule, he could not be found, but had to come back of himself when he was speedily apprehended and conducted to the ceremonial lodge, where he would commence his first bear-

* The Déné word for Black Bear is *ɜəs* or *ɜas* according to the dialect.

† Words of Tsimpsian parentage meaning apparently: Come on, Bear! The nature of those words plainly denotes the origin of the whole institution.

dance in conjunction with all the other totem-people, each of whom would then personate his own particular totem. Finally would take place the potlatch of the newly initiated "bear," who would not forget to present his captor with at least a whole dressed skin.

The initiation to the "Darding-Knife" was quite a theatrical performance. A lance was prepared which had a very sharp point so arranged that the slightest pressure on its tip would cause the steel to gradually sink into the shaft. In the sight of the multitude crowding the lodge, this lance was pressed on the bare chest of the candidate and apparently sunk in his body to the shaft, when he would tumble down simulating death. At the same time a quantity of blood—previously kept in the mouth—would issue from the would-be corpse, making it quite clear to the uninitiated gazers on that the terrible knife had had its effect, when lo! upon one of the actors striking up one of the chants specially made for the circumstance and richly paid for, the candidate would gradually rise up a new man, the particular *protégé* of the "Darding Knife."

PICTOGRAPHY.

"All the known graphic systems originate in a picture-writing as rude as that of the American Indian or of the South African Bushman. All have advanced from the picture to the conventionalized hieroglyphic representing an idea or a word; while from the hieroglyph has sprung the syllabary represented by rougher sketches of the monumental emblems, and requiring a smaller number of necessary symbols. Finally among the more civilized of ancient races the alphabet was gradually introduced as a simplification of the syllabary which reduced the necessary emblems to about a fifth of their previous number."* Gauged after this criterion, the Western Dénés may be said to have been in a state of transition between the first and the second stage of graphic culture; or perhaps, it would be as correct to say that they were already in the second while retaining lingering reminiscences of the first. Their petroglyphs were in a large measure pictures with some admixture of conventionalized forms; but their usual means of communication while travelling and their tattoo marks had, to a great extent, become the mere shadows of the original pictographs.

Of their rock inscriptions I cannot find any better specimen than that reproduced in fig. 190. Its most conspicuous character represents a grizzly bear, the tracks of which may be seen some distance behind. The waving lines at the bottom stand for water, wherefrom a sturgeon

* From an article in the "Edinburgh Review," reproduced in Little's Living Age, Aug. 23, 1890, p. 451.

is seen emerging. The natives are not agreed as to the meaning of the large spider-like figure to the left, but the probability is that it is intended to represent Yihta, the Great Bear. Immediately above is a toad in a somewhat conventionalized shape, while below, and to the left, are two figures of birds, the lower one of which is a grouse. The other signs are the emblems of fishes, figures of men or symbols of objects which cannot now be identified. There is no *ensemble* or unity in the whole. It is only an aggregate of pictures or signs painted in red ochre by different individuals and at different times. Most of them are very old.

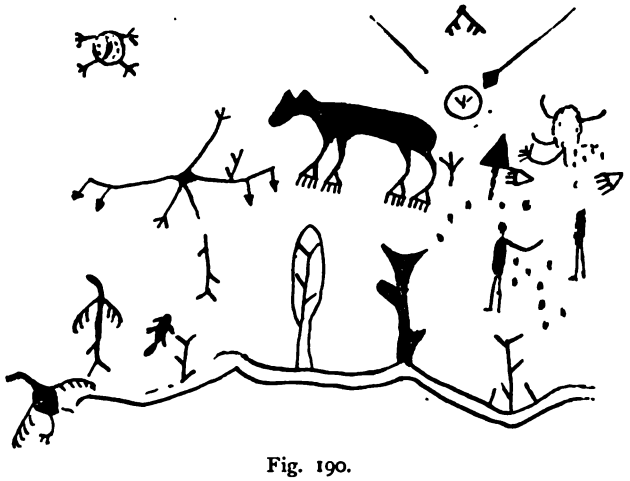


Fig. 190.

The various objects represented are personal totems, and the object in view in depicting them on rocks will be better understood by a reference to the locality of the inscription reproduced above. It is to be seen about half way between this place, Stuart's Lake or Na'kraztli and Pintce, the nearest village by water. By painting in such a conspicuous place the totem which had been the object of his dream, the Pintce Indian meant to protect himself against any inhabitant of Na'kraztli, as the intimate connection between himself and his totem could not fail, he believed, to reveal by an infallible presentiment the coming of any person who had passed along the rock adorned with the image of his totem. Thus it will be seen that clairvoyance had adepts even in such an out of the way place as Stuart's Lake.

Fig. 191 is, of course, a mere picture. The oval circle wherein the cariboo stands is intended to represent a mountain. A shield is instinctively called to mind by fig. 192; but the natives are positive that this is a false impression, as the inner circle stands for a den within or upon a mountain. The four figures between the two circles are the known

emblems of the beaver; but the meaning of the whole figure is not very clear. Such is the case with fig. 193, wherein some say we have a crane, while others profess to see therein some large species of beetle.

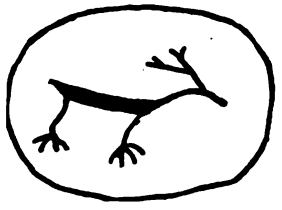


Fig. 191.

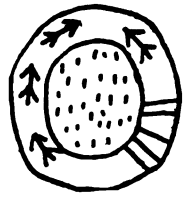


Fig. 192.

Fig. 193.

So far we have dealt with signs or pictures such as seen in stone inscriptions only. But it is chiefly through the tattoo markings or the signs occasionally executed in charcoal while travelling that the Carriers have shown their departure from the earliest or pictorial stage of the graphic art. Even within such classes of totemic representations the gradual alteration from the pictorial or life-like forms to the mere conventional outlines is easily discerned. I need adduce no better illustration

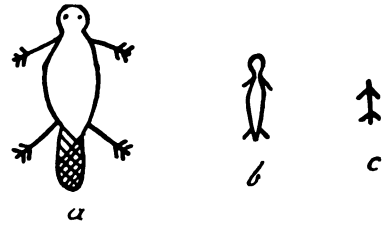


Fig. 194.

of this than the three styles of representing the beaver shown in fig. 194. *A* is the original pictorial form, and is adopted whenever the beaver is tattooed on the breast; *b* is a middle, altered form, with a strong tendency to simplification, and is used in connection with face tattooing, whilst *c* is the conventionalized form of the same, and is the common mode of representing the beaver in those rude, ephemeral drawings in the woods, though it is occasionally found even in ancient rock inscriptions.

I have already stated that tattooing on the breast was rare among the Western Dénés. This is so true that I know of no other totemic marks there situated than the few exhibited herewith. We have just seen that *a* stands for the beaver, *b* represents a toad, *c* and *d* are the fore and hind paws of the grizzly bear, while *e* is the figure of the moon.

All the face tattoo marks which can now be seen or remembered among the Carriers are found in fig. 196. They may be briefly described

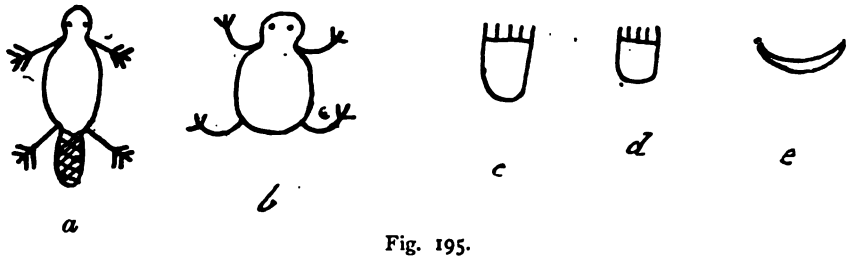


Fig. 195.

thus:—*a* is the emblem of the otter; *b* that of any fish; *c* that of a bird; *d* is a beaver; *e* is the *silhouette* sign of a stick in the water; *f* that of a

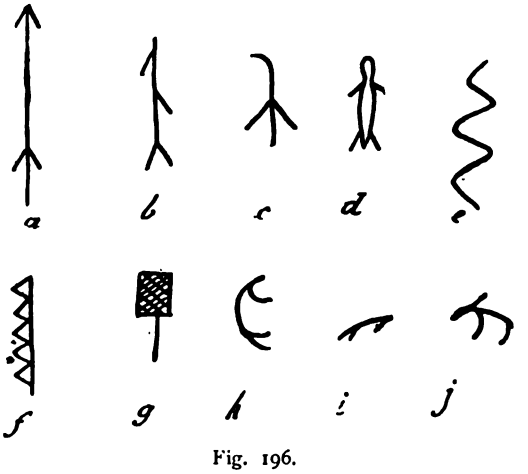


Fig. 196.

mountain; *g* is a fern root digger; *h* is the symbol of the marten; *i* that of the lizard, and *j*, that of the cariboo.

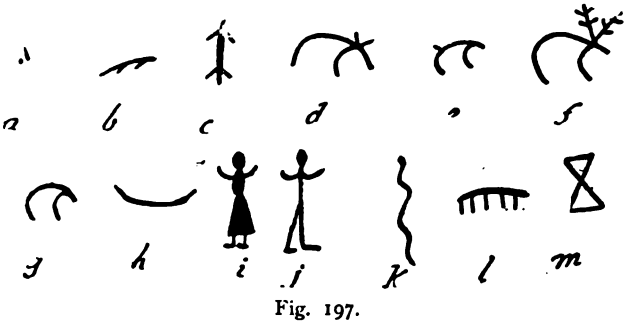


Fig. 197.

Fig. 197 presents us with the graphic signs used as means of communication between different hunting parties. They alone might be

pointed to as the elements of native "writing." The two last are taken from rock inscriptions. They are now unintelligible to the Carriers. Here is the meaning of the others:—*a*, bird; *b*, lizard; *c*, beaver; *d*, bear; *e*, lynx; *f*, cariboo.; *g*, marten; *h*, canoe; *i*, woman; *j*, man; *k*, snake.

These are generally drawn in charcoal on trees or, by exception, on stones, and as such it must be confessed that they afford but a very restricted medium of expression to the native mind. It has therefore to call into requisition any other material means which may be at hand, and it must be said that the use made of them is sometimes wonderful. I was lately travelling in the forest at a time when the yearly re-appearance of the salmon was eagerly looked for. At a certain spot not very far from a stream we came upon one of those aboriginal drawings made by an old man who had no knowledge of the syllabic signs now used to write the Dénè languages. The drawing represented a man with a woman, a horse with a burden, the emblem of a bear with three marks underneath, and a cariboo. Above the whole and hanging from a broken branch were four pieces of young bark cut out in the conventional form of the fish. Now the message was instantly read by my companions, and it ran thus: "Such a one (whom they named)* has passed here with his wife, and a good load of furs, after having killed three bears and one cariboo; and furthermore he captured four salmon *two days ago*. He is now gone in the direction that we follow ourselves." This date could evidently not have been told had the Indian marked with charcoal the sign of the salmon. He was so well aware of this and was so much intent upon fixing the time of the first appearance of the fish that he had had recourse to the pieces of bark, the relative degree of freshness of which he knew could easily be determined by the experienced eye of his fellow Carrier.

This leads me to detail the various non-graphic means of communication between the different bands of huntsmen. Does the traveller intend to mark his passage in the forest? He cuts a switch or rod and plants it in his trail pointing to the direction he is following. Is he in distress, and does he beg for succour at the hands of those who he knows shall pass by the same trail? Forthwith he breaks or bends the top of as many shrubs as possible all along his path. No native party will profess ignorance of his meaning nor, as a rule, leave unheeded his appeal. Other significant combinations will be found sketched in our last figure. Thus *b*, a stick broken by the middle, means: "we are going to camp a

* They identified him by the very circumstance that he travelled with a horse, as he was the only one likely to pass there who possessed such an animal.

short distance off. You need not be in a hurry". *C* has the opposite meaning: "we are going to camp a long distance from here; hurry up!" By disposing the stick as shown in *d*, the natives are understood to say: "we have turned back awhile, but finally gone on." *E* is intended to represent a piece of burnt rag hanging from a bent down rod; it is the signal of famine and an appeal for help, the direction of the stick always

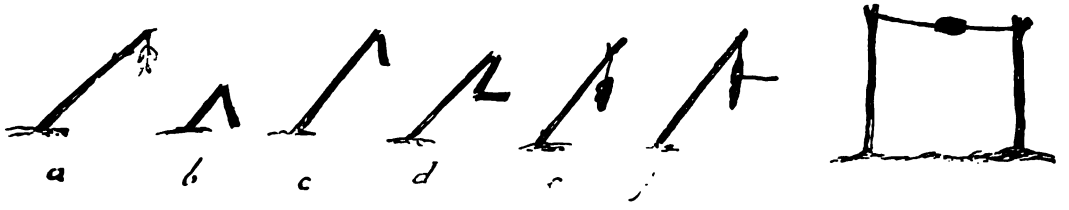


Fig. 198.

pointing to the trail of the distressed party. If, instead of parched rags, an abundance of cariboo or moose hair is to be seen on the stick, the reading must be just the reverse. It is then a notification that the party has killed plenty of cariboo or of moose, and, at the same time, an invitation to go and help dispose of them. *F* is a small bunch of dry grass wherein a small rod has been driven as an indication that a member of the band has been shot. Lastly, when a short stick is found hanging across the trail, as shown in *g*, everybody will understand that a person in the preceding party has come to his death from natural causes.

INDEX.

N. B.—When the same subject is treated in several consecutive pages, only the first is given.

A.

Ages (the prehistoric) not strictly successive, 137.
Ahtena, not Déné, 15.
Alluvial strata, their age exaggerated, 42.
Animals hunted by the Western Dénés, 93—large ones never killed for oneself, 95.
Antiquity of archæological objects exaggerated, 39.
Anthropology, an uncertain criterion of ethnological differences, 17.
Apaches, their habitat, subdivisions and population, 13.
Archæological remains, their age exaggerated, 41.
Archæology of the Egyptians and the Assyrians easy to fully describe, 5.
Armour, wooden, 117—skin, 149.
Arrow-heads, 53—bone, 55—how connected with the shaft, 55.
Arrows, 56—their varieties, 56—how released, 57.
Arrow-shafts, 55.
Aspen, its root used against bleeding, 130.
Astringents, native, 131.
Athapaskan, inappropriate as a generic name, 9.
Atiyéh, a Carrier game, 81.
Atlih, a Carrier game, 78.
Atnas, Adənas, etc., not Déné, 17.
Atrium of winter lodges, 190.
Awls, bone, 69.
Axes, of unpolished stone, 43 — partially polished, 44—polished, 46—how used, 47—of iron, 140.

B.

Babies, how carried, 134.
Babines, their physical peculiarities, 18—habitat, 27—subdivisions, 27—their gambling sticks, 78.
Bad-People, a Déné tribe, its habitat and population, 16.
Bag-net fishing, 91.
Bags, their varieties, 146.
Bait of bone, 72.
Bandelier on the early Navajos, 12.
Bark peelers, 76—bottles, 135.
Bark vessels, 120.
Bear, what part of it not eaten, 107—how its skull is treated, 108—as a totem, 205.
Bear traps, 95—snares, 99.
Beard, not rare among the Babines, 18—how trimmed among the Tsé'kéhne, 139.
Beaver, what part of it not eaten, 108.
Beaver Indians, a branch of the Tsé'kéhne, 11—their habitat, 29.
Beaver snaring, 66—nets, their working, 67—trapping, 87.
Belts, weaving of, 157.
Berries, how treated, 127.
Berry baskets, 122—boilers, 126.
Bible, its authority undiminished by archæological discoveries, 40.
Black-feet, their usual position while sleeping, 187.
Bleeding, how practised, 82.
Blue berries, how prepared, 127.
Blunt arrows, 57.
Boas' map incorrect in one particular, 22.
Boilers, 125.
Bone baits, 72.
Bone implements in use among historical nations, 43.
Bones of animals, how eaten, 49.
Bones of the dead, how treated after cremation, 146.
Bottles, for the castoreum, 66, 135.
Bow-points, 60.
Bows, of the Tsé'kéhne, 58—of the Carriers, 59—how held while shooting, 60
Bowstrings, how made, 58.
Boyle on palæoliths, 63.
Bracelets, 139, 172.
Breast-blankets, 164.
Breast-plates, ceremonial, 167.
Breech-cloth, ceremonial, 180.
Brinton on the distribution of the Dénés, 14—on the Kenai, 15—on Déné technology, 35.
Bronze age, contemporaneous with stone age, 137.
Bulbous root diggers, 115.

C.

Callbreath on the Tahl-tan Indians, 35.
Cambium scrapers, 76.

Canoes, 114.
Cap-holders, 83.
Caps of the Carriers, the, 164.
Cariboo-eaters, their habitat and population, 16.
Cariboo skins, how treated, 68.
Cariboo snares, 100.
Carrier Indians, (the), progressive, 5—their population, 16—physical characteristics, 17—timid, 18—habitat, 24—subdivisions, 24—sociologically considered, 28—their bows, 59—their bow-points, 60—their bone scrapers, 70—their utensils, 120—how they carry their babies, 134—using copper and iron before contact with the whites, 137—their drums, 150—formerly practically unacquainted with snow-shoes, 151—their weaving method, 156—their ordinary head-dress, 164—their ceremonial costume, 172—their houses, 184—their store-houses, 196—their mortuary columns, 199—their graphic system, 206.
Carvings, 199.
Castoreum bottles, 66, 135.
Categories of Déné nouns, 32.
Ceremonial dress of the Carriers original, 172.
Chaldean head-dress compared with that of the Carrier noblewomen, 177.
Charcoal, as a means of ornamentation, 170.
Cherokees, mound-builders, 39.
Chickasaw, mound-builders, 40.
Chippewayans, not the southernmost of the Déné tribes, 9—their habitat and population, 16.
Chipping, how done, 65.
Clans of the Carriers, 203.
Cloaks, 164.
Clubs, war, 64.
Columns, mortuary, 199.
Combs, 117.
Confession to the shaman, 107.
Continence, regard for, 107.
Copper, in use in prehistoric times in the Mackenzie valley, 136—in use contemporaneously with stone implements, 137—in use among the prehistoric Carriers, 137—how procured formerly, 137—its use probably ancient, 138.
Copper tower, the, 137.
Cow-parsnip, how eaten, 129.
Cradles, 133.
Cranberry, swamp and highbush, eaten, 127.
Craniometry, an uncertain criterion of ethnologic certitude, 17.
Crescents in the septum, 167.
Crossbows, 59.
Cuirass, of wood, 117—of skin, 149.
"Cut arrows," 56.
Cuticle (inner) of skins, how removed, 70.

D.

Daggers, of stone, 63—of steel in pre-European times, 142.
Dall on labrets, 170.
"Darding Knife," the, 206.
Déné (the), progressive, 5—their name, 8—the nature of their territory, 11—divided long ago in two camps, 12—their distribution, 13—misconception as to their ethnographical status, 14—classification and population of all the tribes, 16—points of physical similarities, 18—psychologically differing among themselves, 18—philologically homogeneous, 21.
Déné Dindjié, improper as a collective name, 9.
Dentalium, its fitness as an article of ornamentation, 178.
Dentalium nose-ornaments, 168.
Devil's bush, its medical properties, 132.
Dip-nets, 159.
Dishes, 119.
Diuretics, native, 131.
Dog collars, 139.
Dog-Ribs, a Déné tribe, its habitat and population, 16—knew copper before contact with the whites, 136.
Dress of the Western Dénés, 162—of pubescent girls, 165.
Drills, 143.
Drinking tubes, 82.
Drums, 150.
Dug-outs, formerly unknown, 115.
Dyes, 173.

E.

Ear pendants, 166.
Eastern Dénés: knew of copper before contact with the whites, 136—their dress, 162.
Elk, now disappeared from among the Carriers, 93.
Emmenagogue, native, 131.
ƺs, a fish-trap, 89.
ƺsronh, how cooked, 116.
ƺstas and the swans, 104.
Ethiopians, using stone and bone weapons, 42.
ƺzih, 53.

F.

Fat scrapers, 68.
Feathering of the arrows, how made, 56.
Febrifuge, native, 130.
Fenni, (the), using bone arrows, 43.
Fern root, how cooked, 116.
Fern root diggers, 115.
Finger rings, 140.

Fire, primitive mode of starting a, 114.
Fire-bags, common, 148—ceremonial, 180.
Fire-place, where situated, 187.
Fire-wood, how procured by the poorer classes, 47.
Fishes, species of, 73.
Fish-hooks, 72.
Fishing, 71—with bait, 72—with traps, 84.—with bag nets, 91.
Fish traps, 84.
Fish trays, 123.
Flaking, how done, 65.
Floats, 111.
Folk-lore, differs according to the tribe, 21.
Forts, 195.
Foxes, different varieties in the same litter, 95.
Fox snares, 102.
Fraas on ancient weapons, 42.
Frazer on the varieties of totems, 203.

G.

G and W commutable in the Aryan languages, 8.
Gambler and the Great Bear, the, 79.
Gambling-sticks, 77.
Game sought after by the Western Dénés, 93.
Games of the Western Dénés: *nɔt'sɔ'a*, 78—*atlih*, 78—*atiyéh*, 81—*tətquh*, 111—*tə'ko'*, 112—*nɔzaz*, 112—*'keilapas*, 112.
Gentes, their number, 203.
Geology against the great age attributed to archæological remains, 42.
Gorgets, unknown, 35.
Gouges, unknown. 35.
Graphic systems, their origin, 206—that of the Carriers, 208.
Graves, monuments on, 200.
Great Bear and the Gambler, the, 79.
Great Bear and the Hunter, the, 194—deductions from that legend, 195.
Grizzly Bear, are there two varieties of it? 94.

H.

Hair, sometimes fair among the Carriers, 18—mode of wearing it, 181.
Hair scrapers, bone 69—steel, 143.
Hair tweezers, 138.
Hale on the country of the Eastern Dénés, 11.
Hammers, stone, 47.
Hares, a Déné tribe; its habitat and population, 16.
Head-dress of the Carriers, 164—of the pubescent girl, 165—of the same when of noble parentage, 166—of the noblemen, 173—of the noblewomen, 177—the same compared with that of the Chaldean Kings, 177—of the shamans, 181.
Head-scratchers, 82.
Heart of animals, not eaten, and by whom, 107.
Hemlock, its medical properties, 132.
Hæmorrhage, how stopped, 131.
Hides, how dressed, 49, 69, 145.
History against the great age attributed to archæological remains, 42.
Hole-borers, 143.
Horse-tails, their medical properties, 131.
Houses, *see* Lodges.
Hupa, their habitat and numbers, 13, 16—their influence over neighbouring tribes, 19—their conservatism, 20.
Hurdles for the salmon weirs, 85.
Huts, subterranean, 191.

I.

Ice-breakers, 75.
Ice-scoops, 156.
Indians, mound builders, 40.
Industries, why and how treated of, 6.
Iron, in use among the negroes of Africa, 137—in use among the pre-historic Carriers, 140.
Iron, axes, when first introduced, 140—how iron tools were prized on the Coast, 142.

J.

Juniper, its wood used to make bows with, 59—its boughs used as a febrifuge, 130.

K.

Kekule houses, 190.
'Kɔn, 85, 186, 196.
Kenai, their ethnographical status, 15.
Kɔs, their use, 87.
Kettles, prehistoric bark, 125.
Kinnikinik, its berry eaten, 128.
K'naia-kho-tana, their ethnographical status, 15.
Knap-sacks of the Carriers, 148.
Knives, salmon, 51—skinning, 51—carving or working, 52.
'Kûntzai, their make and working, 87.
Kutchin, identical with Loucheux, 15.

L.

Labrets, 170.
Ladles, 75—how made, 76.
Lances, known to prehistoric Carriers, 149.
Land-locked salmon, how captured, 74.
Language, the chief characteristic of man, 21—of the Carrier subdivisions a little different, 27.

Length measures, 92.
Lenormant on iron in Africa, 137.
Lichen, how eaten, 130.
Lily, its bulb eaten, 129.
Lipans, habitat and present population, 14, 16—a dishonest tribe, 19.
Lodges, ceremonial, 185—common, 188—fishing, 189—winter, 189—of the Tsé'kéhne, 192.
Looms of the Carriers, the, 156.
Loon and the Old Man, the, 171.
Loucheux, identical with Kutchin, 15—their habitat and population, 16—their dress, 162.
Lubbock (Sir John), mistaken as to the age of archæological finds, 41.
Lu[em, or Bear totem, how assumed, 205.
Lyell (Sir Charles), mistaken as to the age of archæological finds, 41.
Lynx, feared by the women, 108.
Lynx and the Woman, the, 108.
Lynx traps, 97—snares, 101.

M.

Maize, not grown by the Dené, 36.
Man, his age absurdly exaggerated, 41.
Marmot skins, how treated, 68.
Marmot traps, 98—snares, 103.
Mas, 67.
Masks, 118.
Material of the arrow and spear heads, 53—zealously guarded, 65.
Mats of the Tsi[Koh'tin, the, 157.
Maul, wooden, 111.
Means of communication while travelling, 210.
Measures of length, 92.
Medicinal herbs, 130.
Menses, observances relative to the, 107.
Mesh-sticks, 158.
Middle class of the Carriers, 204.
Mittens, 164.
Mocassins, their material, 163—not used in rainy weather, 163.
Months, their native names, 106.
Monuments, rare, 199.
Moose skin scrapers, 143.
Morice on the varieties of Dené nouns, 32—on the "cut-arrows," 56—on beaver snaring, 66—on fern root cooking, 116—on the introduction of copper among the Carriers, 137—on the head-dress of pubescent girls, 165.
Morse on arrow release, 57.
Mortars, unknown, 35.
Mortuary columns, 199.
Mosaical chronology, its accuracy not weakened by modern discoveries, 40.
Mounds unknown among Dené, 35—the work of Indians, 40.
Muskokis, probably mound-builders, 40.
Muskrat trapping, 87.
Mythology, why occasionally referred to in the monograph, 7.

N.

Nah'ane, different spellings of their name, 31.
Na'kwəl's descendants, 141.
Navajos, long established in the south of the United States, 12—their habitat, 13—still old fashioned, 20—philologically congenerous with the Northern Dénés, 22.
Nazrwət, a fish trap, 85.
Necklaces, 170.
Needle pouches, 149.
Nets, their material, 159—beaver, 67.
Nət'ɔ·a, a game, 78.
Netting, 158.
NəyɔRhwollus and the Gambler, 79.
Nɔzaz, a game, 112.
Niblack on maize growing Indians, 35.
NiKɔdin·ai, 168.
Northern Dené, timid and not industrious, 18—of assimilative dispositions, 19.
Nose-pendants, 167.
Nose-rings, 168.
Nouns, the four categories of Dené, 32.

O.

Observances of the hunters and women, 106, 165.
Ochre (red) as a means of ornamentation, 170.
Old man and the Loon, the, 171.
Oregon grape, how eaten, 129.
Orthography of Indian words, 34—of the names of Indian tribes, mixed, 30.
Osier-willow, its medical properties, 131.

P.

Packing, how done, 118.
Packing bags, of the women, 147—of the men, 161.
Packing chairs, 118.
Paddles, how used, 115.
Palæoliths, their age exaggerated, 40—found along with neoliths, 63.
Peelers, 76.
Pendants, 166.
Pestles, stone, 48.
Petitot on the name "Dené-Dindjié," 9—on copper and iron among Eastern Dénés, 136—on prehistoric weapons, 149—on the dress of the Eastern Dénés, 162.
Petroglyphs, 206.

Philology, its importance as an ethnographical criterion, 21—its bearing on archæology, 32.
Pictographs, 206.
Pilling on the word "Athapaskan," 9.
Pipes, stone, 36.
Plan of the monograph, 6.
Plants, those the economic value of which is not appreciated unnamed, 127—which are eaten by the Western Dénés? 128.
Potlatch, of comparatively recent origin, 125.
Pottery, unknown among the Western Dénés, 35.
Powder pouches, 148.
Powers on the Hupa, 20.
Prehistoric ages not strictly successive, 137.
Prognostications common among the Carriers, 110.
Pubescent girls, their dress, 165—their drinking tubes, 81—their head scratchers, 82—their peculiar observances, 107.
Purgatives, native, 130.

Q.

Quintilian on Language, 21.

R.

Rabbit snares, 103—skins, how utilized, 156, 164.
Rattles, 118.
Red willow, used as wattle, 84—its medical properties, 131.
Rings, 140, 166.
Robe, ceremonial, 179.
Rock inscriptions, 206.
Rose, its medical properties, 132.

S.

Salmon, species of, 73—how caught, 84—how cured, 92—how kept, 49, 196.
Salmon fishing, 84.
Salmon oil, how obtained, 92.
Salmon pits or cellars, 197.
Salmon roe, how prepared, 197.
Salmon weirs, 85.
Sarcees, how they separated from the Beavers, 11—their present habitat, 15—their population one hundred years ago, 29.
Satchets, 146.
Scaffoldings, on the banks of rivers, 91—of the Tsé'kéhne, 197.
Scoops, 156.
Scrapers, stone, 49—how made, 50—bone, for the fat, 68—horn, for the same, 70—hair, 69—cambium, 76.
Sedatives, native, 131.
Semilkameen Indians partly descended from the Tsi[Koh'tin, 24.
Service-berry, how preserved, 125.
Shamans, their head gear, 181.
Shields, 117.
Shushwap Indians, their former relations with the Tsi[Koh'tin, 23.
Signalling in the woods, 210.
Sinkers, rude and uncarved, 36.
Skin tanning, 49, 69, 145.
Skull-crackers, stone, 64.
Slaves, their habitat and numbers, 16.
Sleeping place in the lodge, 187.
Slickstones, 49.
Smoking, originally unknown, 36.
Snares, bear, 99—cariboo, 100—fox, 102—marmot, 103—rabbit, 103—waterfowl, 104—how prepared, 107.
Snaring devices, their details useful, 99.
Snow-shoes, formerly practically unknown among the Carriers, 151—earliest model, 152—modern types, 152—how made, 153—of the children, 154.
Snow shovels, 116.
Snow walking sticks, 155.
Soap-berry, how prepared for eating, 128.
Solutrian-like implements, 63.
Sore eyes, native remedy against, 132.
Southern Dénés, long separated from the Northern Déné, 12—confused ideas as to their ethnographical divisions, 13.
Spear-heads, 62.
Spindles, 114.
Spokeshaves, 144.
Spoons, 76.
Spruce, its shoots used as febrifuge, 130.
Spruce root-weaving, 134.
Steel daggers in prehistoric times, 142.
Stockings, native counterpart of, 165.
Stone implements, in use among historical nations, 42—contemporaneous with copper implements, 137.
Store-houses, 196.
Strings, of the bows, how made, 58—of the snares, how made, 104.
Sturgeon, how caught, 75.
Sûnti, how cooked, 116.
Superstitious observances of the hunters and the women, 106, 165.
Swaddling clothes of the Carrier babes, 133.
Sweat-houses, 197.
Sweet-flag, how eaten, 129.

T.

Tacitus on the arms of the Fenni, 43.
Takhe[ne, wrong readings of their name, 30.
Tanning, how done, 49, 69, 145.

Target disc or wheel, 112—shooting, 113.
Tattooing, 182.
Tattoo marks, 208.
Tcajyaj, a bark vessel, 122.
Tə'ko', a Carrier game, 112.
TəsKai, a fishing device, 90.
Thajthan Indians, weavers of mountain goat wool, 35.
Théɣmək, how caught, 159.
ThésKai, a fishing device, 90.
Théssateñ, a fishing implement, 72.
Thomas on mounds, 39.
Throwing-rods or *tətquh*, 111.
Time, means of reckoning, 106.
Tinne, Tinneh, inappropriate as a generic name, 8.
Tlingit, why so named, 10.
Tobacco, originally unknown, 36.
Tolmie & Dawson's map, differing from the actual limits of the Carriers' territory, 26.
Tommy-sticks, 64.
Totems, carved on house posts, 186, 199—their different kinds, 203—how honored, 204—honorific, 204—how assumed, 205—painted on rocks, 207—tattooed on the person, 208.
Totunies, the contradictory readings of their name, 13.
Trapping devices, their details useful to the ethnologist, 98.
Traps, fish, 84—bear, 94—small animal, 96—lynx, 97—marmot, 98—how prepared, 108.
Travelling, formerly difficult in winter, 151.
Travelling marks or signals, 210.
Trays, bark, 123.
Trough-like vessels, 119.
Tsé'kéhne, population, 16—physical characteristics, 17—honest, 19—sociologically considered, 28—subdivisions, 28—bows, 58—bone scrapers, 70—spoons, 76—gambling sticks, 78—how they hunted cariboo in olden times, 100—their names of the months, 106—their utensils, 120—how they trim their beard, 139—their drums, 150—their snow shoes, 154—their lodges, 192—their provision stores, 197.
Tsi|Koh'tin, population 16—physical characteristics, 18—habitat and subdivisions, 22—sociologically considered, 28—bone scrapers, 70—fish harpoons, 71—gambling-sticks, 78—cradles, 133—how they carry their babies, 134—their vessels, 134—their drums, 151—their method of weaving, 156—their dress, 164—their store-houses, 197.
Tunics, of the Carriers, 163.
Tweezers, 138.

U.

Umkwa Indians, their habitat, 16.
Unknown technological objects, 35.
Utensils, of primitive material, 120—description and mode of fabrication, 121.

V.

Villages, 184.
Vowels, unimportant in Déné, 10.

W.

Wailáki Indians, their habitat, 16.
Walking sticks, for the winter, 155.
War, how started, 195.
Wash-tubs, bark, 132.
Waterfowl, how caught formerly, 104—now 105—in China, 105.
Water vessels, 124.
Wattle, 84, 186, 196.
We, a fish-trap, 89.
Weasel, what use made of its skin, 177.
Weaving, 156—of the spruce roots, 134.
Wedges, stone, 47—bone, 75.
Weirs, how constructed, 84.
Western Dénés, the nature of their territory, 11—misconception as to their ethnographical status, 14—classification of the, 30—not maize growing, 36—unæsthetic, 36—brave against wild animals, 94—their dress, 163.
Whistles, ceremonial, 81.
Widow satchels, 146.
Wigs, ceremonial, 173.
Wild goat skins, how treated, 68.
Willow-herb, how eaten, 129.
Windows, none in ancient lodges, 187.
Winter dress, 164.
Winter travelling, difficult, 151.
Woman and the Lynx, the, 108.
Women, their dress not much differing from that of the men, 164.
Wood-peckers, what use made of their feathers, 177.

Y.

Yellow-knives, a Déné tribe; its habitat and population, 16—acquainted with copper in prehitoric times, 136.
Yuta-sKai, a fish trap, 86.

WORKS QUOTED OR REFERRED TO.

BANDELIER, A. A.—Indians of the Southwestern United States.

BIANCONI, J. A.—Matériaux pour l' Histoire Primitive et Naturelle de l' homme; Toulouse, 1876.

BOAS, F.—Fifth, Sixth and Seventh Reports on the Northwestern Tribes of Canada; B.A.A.S. 1889, 1890, 1891.

The Central Eskimo; Sixth Annual Report of the Bureau of Ethnology; Washington, 1888.

BOYLE, D.—Archæological Report for 1891, Toronto.

BRINTON, D. G.—The American Race; New York, N. D. C. Hodges, 1891.

CALLBREATH, J. C.—Notes on the Tahltan Indians; in Notes on the Indian Tribes of the Yukon District, reprinted from Annual Report Geological Survey of Canada; Ottawa, 1887.

DAWSON, G. M.—Notes on the Shushwap People of British Columbia; Transactions of the Royal Society of Canada, Section II., 1891.

On the Haida Indians of Queen Charlotte Islands; Montreal, 1880.

Report on the Queen Charlotte Islands; Montreal, Dawson Bros., 1880.

DAWSON AND TOLMIE.—Comparative Vocabularies of the Indian Tribes of British Columbia; Montreal, 1884.

FRAAS, O. - Die alten Höhlenbewohner.

FRASER, J. G.—Totemism; Edinburgh, 1887.

GATSCHET, A. S—The Karankawa Indians; Cambridge, Mass., 1891.

The Klamath Indians of Southwestern Oregon; Contributions to North American Ethnology; Washington, 1890.

GUNN, D.—History of Manitoba from the earliest settlement to 1835; Ottawa, 1880.

HALE, H.—Language as a Test of Mental Capacity; Transactions Royal Society of Canada, Sect. II., 1891.

HOLMES, W. H.—A Study of the Textile Art; Sixth Annual Report Bureau of Ethnology; Washington, 1888.

HOUGH, W.—Fire Making Apparatus in the U.S. Museum; Report U.S. Museum, Washington, 1890.

JORDAN, D. S. and GILBERT, CH. H.—Synopsis of the Fishes of North America; Washington, 1882.

LEGAL, E.—Les Indiens dans les plaines de l'Amérique du Nord; Petites Annales, O. M. I., Paris, 1891.

LENORMANT, F.—Die Anfänge Der Cultur, Vol. I.

MACKENZIE, Sir A.—Voyages from Montreal on the River St. Lawrence, through the Continent of North America to the Frozen and Pacific Oceans, in the years 1789 and 1793; London, 1801.

MACKENZIE, A.—Descriptive Notes on certain Implements and Weapons, etc., from Graham Island; Transact. Roy. Soc. Can., Sect. II. 1891.

MASON, O. T.—The Ray Collection from Hupa Reservation, Washington. Anthropology in 1886; Washington.

MATTHEWS, W.—The Mountain Chant; Fifth Annual Report of the Bureau of Ethnology; Washington, 1887.

MORGAN, T. J.—Sixtieth Annual Report of the Commissioner of Indian Affairs; Washington, 1891.

MORICE, A. G.—The Western Dénés, their Manners and Customs; Proceedings of the Canadian Institute, Vol. VII.; Toronto, 1890.

The Déné Languages considered in themselves and incidentally in their relations to non-American Idioms; Transactions Canadian Institute, Vol. I., Toronto, 1891.

Are the Carrier Sociology and Mythology Indigenous or Exotic; Transactions Roy. Soc. Can., Sect. II., 1892.

MURDOCH, J.—Ethnological Results of the Point Barrow Expedition, Ninth Ann. Rep. Bur. Ethnology, Washington, 1892.

NIBLACK, A. P.—The Coast Indians of Southern Alaska and Northern British Columbia; Report U. S. National Museum, 1890.

PETITOT, E.—Monographie des Déné-Dindjié; Paris, Leroux, 1876.

En route pour la Mer Glaciale; Paris, 1888.

Six Légendes Américaines, identifiées à l'Histoire de Moise; Paris, A. Hennuyer, 1877.

Rapport Succinct sur la Geologie des Vallées et de l'Athabaskaw-Mackenzie et de l'Anderson; Paris, A. Hennuyer, 1875.

Appendice relatif aux armes de pierre des Indiens Arctiques; Paris, A. Hennuyer, 1875.

PILLING, J. C.—Bibliography of the Athapaskan Languages; Washington, 1892.

POWELL, J. W.—Indian Linguistic families; Seventh Annual Report Bureau of Ethnology, Washington, 1892.

Third Annual Report Bureau of Ethnology; Washington, 1884.

POWERS, S.—Contributions to North American Ethnology; Vol. II., Washington.

QUINTILIAN—De Institutione oratoria, translated by La Harpe; Dijon, 1820.

ROYCE, C. C.—The Cherokee Nation of Indians; Fifth Annual Report of the Bureau of Ethnology, Washington, 1887.

SOUTHALL— Recent Origin of Man.

THEIN, J.—Christian Anthropology; New York, Benziger Bros., 1892.

THOMAS, C.—Manuscript Troano; Contributions to North American Ethnology, Vol. V., Washington.

Burial Mounds of the Northern Section of the U. S.; Fifth Annual Report Bureau of Ethnology, Washington, 1887.

Work in Mound Exploration of the Bureau of Ethnology, Washington, 1887.

The Problem of the Ohio Mounds, Washington, 1889.

VIGOUROUX, F.—Les Livres Saints vengés, Vol. III.

Dictionnaire de la Bible; Letouzey et Ané; Paris (still in course of publication).

And a few others with which I am not personally acquainted.

ADDENDA ET CORRIGENDA.

Page 25—After paragraph 4 add the following as an additional subdivision :—Hwozahne, two villages, namely, Stony Creek (Saï'kəz), population 88, and Laketown or Nuɬkre, population 65, both of which are situated a little south of Fraser Lake.

Page 30—After "Fort George" insert:—Hwozahne, south of Fraser Lake

Page 35—Strike out "the Eskimo" and add :—to which might almost be added the Eskimo, were it not that J. Murdoch (Ethnological Results of the Point Barrow Expedition, Ninth Ann. Rep. Bur. Ethnology, Washington, 1892) states that he obtained from a Point Barrow tribe three fragments of a sort of pottery, the material of which "was said to be earth (nu'na) bear's blood and feathers, and appears to have been baked" (p. 91).

Fig. 199.

Page 118—Dele the whole paragraph beginning "These other objects" and substitute :—Three other objects, which as sociological items were also due to the influence of the maritime tribes, but had become naturalized among, and were made by, the Carriers, were the *nɬɣrwəs* or medicine-rattle, the *hanə'taih*, or ceremonial mask, and the *t'sak*, or long, festival dish. These were almost the only objects of art of genuine Dené manufacture to which I can point, and yet I do not think I unduly depreciate my Indians' artistic capabilities by adding that they were rather below than above the average of similar aboriginal carvings. The appositeness of this remark will become evident by a comparison of fig. 199, wherein we have a representative Carrier medicine-rattle, with illustrations of similar implements so frequently met with in modern essays on the Northwest Coast Indians. As may be seen by the cut *b*, the Dené rattle is made of two hollowed halves bearing some resemblance to wooden dippers. Its material is birch, and its only ornamentation is in paint, not carving. The figure explains the mode of connection of the two parts of the rattle.

The masks were used only by mimics accompanying by grotesque gestures and jerkings of the head the dance of a privileged few; but the rattles served a double purpose: they did service in connection with a notable's dance, being then held in the hand by the dancing personage himself, and also as an accompaniment to the incantations of the *tsyen* or shaman. No ceremonial masks of genuinely Déné make are now available for illustration: but such objects are, even at the present day, so common among the natives of the Pacific Coast that they hardly need any description. It may suffice to refer the reader unacquainted with North American aboriginal paraphernalia to the plates or figures illustrating. . . .

Page 181—After "their occult art" insert:—Let me add that some of these head-dresses, while retaining the name of *cyas-krei*, were composed of beaver-teeth, sometimes daubed with red ochre. One such specimen recently came into my possession which lacks the double row of dentalium shells usual with crowns made of real bear's claws.

SESSION 1892-93.

FIRST MEETING.

First Meeting, 5th November, 1892, the President in the chair.

Letters were read from the American Society of Civil Engineers and from the United States Weather Bureau.

Donations and Exchanges since last meeting, 1552.

The following were elected members: — Miss Marcella Wilkes, W. H. Marcon, Dr. Oronhyatekha, R. H. Bowes, W. Morrison.

The following gentlemen were, on the recommendation of Council, elected corresponding members for three years:—R. G. Haliburton, Q.C., F.R.G.S., Dr. T. W. Beemer, Rev. A. G. Morice, O.M.I.

The following motions were passed:—

Moved by J. C. Hamilton, seconded by Prof. Macallum:—

"That this Institute recognizes with very sincere regret the great loss it has sustained since its last session in the death of four of its honoured members: — His Honour Sir Alexander Campbell, K.C M.G., Sir Daniel Wilson, LL.D., D. A. O'Sullivan, LL.D., Q.C., and Nelson G. Bigelow, M.A., LL.D., Q.C., M.P.P., and that a minute of this resolution be entered in the Transactions of the Institute."

Moved by Dr. Kennedy, seconded by Alan Macdougall:—

"We, the members of the Canadian Institute, ask to be permitted to add our tribute of respectful regret and sorrow on the loss sustained by our province in the death of Sir Daniel Wilson. For over thirty-eight years a member of the Institute, he took a deep interest in its progress, enriching its Transactions by numerous contributions of his talented pen. Elected President in 1859, he for many years afterwards remained a constant and warm friend till in 1884, as a tribute to his interest in our work and a respectful recognition of his labours in Literature, Archaeology, and Ethnology, he was elected an honorary member, the highest distinction the Institute could confer upon him. The Institute at this its first meeting after his death records its appreciation of the services rendered by Sir Daniel Wilson, mourns for the loss it has sustained, and conveys to his family its respectful expression of sympathy in their great and deep affliction."

Moved by Prof. Macallum, seconded by James Bain, Jr. :—

"The Council and members of the Canadian Institute desire to tender to Professor Loudon their congratulations on his appointment to the Presidency of the University of Toronto, and to express the hope that he may long live to occupy the position for which he is so well qualified. They rejoice to see in this appointment of a former President of this Institute to the highest office in the Provincial University, a tribute to the character of the scientific work done by the Institute and an augury of a continuation of the close relations which should exist between the two leading scientific bodies in the province."

Mr. J. W. L. Forster then presented to the Institute a portrait of Sandford Fleming, LL.D., C.M.G., which was acknowledged by the President.

Mr. Forster, in handing the portrait to the President and members, said :—

"Sirs,—There are not many ways in which I can directly advance the scientific departments of the Institute, but this task was undertaken with the hope that in some way it would serve to encourage and deepen the interest in the work you are doing. I was moved to the act also because of my humble opinion no one better deserves this recognition at your hands than the subject of the picture in view of his services in the past and present relationship to the Institute, and I was prompted to this by the knowledge that what is mortal of men will vanish from our sight, and there are men whose memory is worthy of being cherished. The hope is indulged in that this portrait will by this service be prized for generations to come.

The President said in reply :—

"There are jewels that we must provide with a suitable setting, and the hope is renewed that a suitable home shall soon be secured for the Institute, and that this portrait will be one of its chief ornaments. Not only is this a liberal gift from the artist, but a tribute to science from the fine arts. The Institute will jealously guard this treasure, which is a worthy tribute to its most distinguished living member."

The Secretary read a letter from Dr. Sandford Fleming, in which he regretted his unavoidable absence, and warmly acknowledged the honour conferred upon him. The letter contained some interesting reminiscences of his early connection with the Institute, and of those

associated with him in its foundation. After sketching the history of the Institute since that time, he adds :—

"I have touched on the place which the Canadian Institute has attained among modern scientific societies. The Institute is quietly and unobtrusively gaining for itself an honourable name. The work is intimately associated with the life and progress of the Dominion, and as the years come and go it will, I confidently believe, do its part in promoting the purposes of science in inaugurating needed reforms, and in advancing the best interests of society."

SECOND MEETING.

Second Meeting, 12th November, 1892, the Vice-President in the chair.

Letters were read from the Prisoners' Aid Association, and the Chicago Historical Society.

Messrs. Arthur B. Willmott and Charles B. Miller were elected members.

Donations and Exchanges, 81.

The following resolution was moved by Mr. G. Kennedy, LL.D., seconded by Mr. G. G. Pursey, and unanimously adopted :—

"In accepting from Mr. Forster his magnificent gift of a portrait of our distinguished honorary member, Mr. Sandford Fleming, C.E., LL.D., C.M.G., etc., the members of the Canadian Institute desire to express their appreciation of the unselfish devotion to art and the interest in the Institute which have prompted Mr. Forster to this generous act, and they hereby tender to him their sincere gratitude for so fine a specimen of his handiwork, which will, they trust, hand down to future generations the counterfeit presentment of one who so deservedly holds a high place in the respect not merely of the members of the Institute, but of the entire Dominion of Canada."

A. Hamilton, M.A., M.D., read a paper on the "Physiology of the Lips in Speech," of which the following is a synopsis :—

The functions, or physiology, of the lips in speech are chiefly (1) to modify vowels by the shape assumed ; (2) form the consonants called labial. The labial effect on vowels has been called "rounding." In what this consists has not been stated anywhere definitely and lucidly. To a less extent this is true of consonants. To give a lucid and true statement of lip-function is the object of the paper. It simplifies matters

to slightly notice the many muscles of the face required to express the emotions and perform other vital acts and concentrate attention on (1) the orbicularis oris, that purse-string muscle which surrounds the mouth by its action and produces the *o*-family of vowels par excellence; (2) the elevators of the upper and lower lips, causing their protrusion, producing the *u*-family of vowels. In *o*-vowels purse-string contraction or true "rounding" prevails; in *u*-vowels, protrusion. A marked parallel obtains between the orbicularis muscle surrounding the eye, shutting the lids and throwing the skin into transverse wrinkles. The elevator of the upper lid is analogous in function to the elevator of the upper lip. The Roman alphabet is an admirable one for annotating vowel sounds, because it divides the vocal scale into five grades, which (in descending pitch) are *i*, *e*, *a*, *o*, *u*. In English we appear to have developed open *o* into a new primary vowel, making *i*, *e*, *a*, *o*, *o*, *u*, as heard respectively in machine, vein, art, law, no, truth. It is remarkable that we in Canada should be so slow to adopt Roman or Continental pronunciation of Latin, while it is taught everywhere else, even in the seats of learning in conservative Britain—a reflection on our educationists which they should not be slow to rectify, unless willing to lag behind the age. The *o*-family of vowels, or those in which circular contraction is exclusive or predominant, was then taken up seriatim in English (standard and dialectic) and some chief forms in French and German. Then the *u*-family, in which protrusion prevails, was treated. The regular labial consonants *f*, *v*, *p*, *b*, *m*, were then explained as to their formation, as were also Spanish *b*, German *w*, Japanese and Hungarian *v*, Greek *b*, and *ph*, and the two consonants beginning the French words *oui* and *huile*.

THIRD MEETING.

Third Meeting, 19th March, 1892, the President in the chair.

Dr. Meredith and Messrs. Pearce and McCrossen were elected delegates to the Prison Reform Conference.

Donations and Exchanges, 70.

Prof. L. E. Horning was elected a member.

A paper by Rev. John McLean, M.A., Ph.D., on the "Social Organization of the Blackfoot Indians" was read by Mr. Alan Macdougall, C.E.

A paper by H. R. Wood, M.A., entitled, "Contributions to Canadian Mineralogy," was read by Mr. G. Kennedy, LL.D. This short paper

had particular reference to some crystals of corundum and its gem variety sapphire. They were collected with a number of other minerals at the base of the Laurentian range in the vicinity of Papineau creek, in the township of Carlow. The sapphire was found along the banks of the Yak river, weathered out from a grey granite. It has been stated by Dr. Hoffman, in notes of minerals occurring in Canada, that corundum has only been found in the township of Burgess, Lanark county, Ontario.

FOURTH MEETING.

Fourth Meeting, 26th March, 1892, the President in the chair.

The President, Dr. Clark, and Messrs. Pursey and L. J. Clark were appointed delegates to attend the Conferenee on Social Problems, on 9th and 10th December.

Donations and Exchanges, 48.

Dr. Daniel Clark read a paper on "The Brain as the Organ of the Mind." He gave illustrations on the blackboard of the exceptional arrangement in the brain of the blood circulation, and how this differed from the system in other parts of the body. He gave the apparent reasons for this anomalous construction. He described the various structures of the substance of the brain and their functions in the organism, especially as media of sensation and volition. He gave illustrations of how impressions produced on the brain are always retained, and how valuable this law is in memory. The functions of all the bodily cells were related—each according to its kind—and more especially the varied work of brain cells in all mental phenomena. The cells were the ultimate physical organisms in relation to mind operations. Brain power was determined by their number more than by brain weight. A small brain well equipped had more tone and energy in it than a large brain not thus endowed. The absolute weight and the relative weight to that of the body were not safe guides to determine brain power. The different definitions of mind were discussed, that of the theologian, that of the metaphysician, and that of the physiologist. The battle of schools raged more over definitions than over facts, as was usually the case. The localization of brain function, according to the modern schools of Fevrier, of Charcot, of Richet, and of Campanini, were explained, as was also the recently published theory of the German Wiessman in antagonism to the theory of Darwin in respect to the hereditary transmission of acquired character.

FIFTH MEETING.

Fifth Meeting, 3rd December, 1892, the President in the chair.

Donations and Exchanges, 154; also to the Biological Section, 107 bird-skins, by Dr. Walker, of Orillia.

Miss Sarah A. Flood and Mr. C. H. Keefer, C.E., were elected members.

The Secretary, for Professor Campbell, of Montreal, read a paper on "A New Reading of the Buddhist Inscriptions of India."

Mr. Andrew Elvins read a paper on "The Planet Jupiter and his Satellites." He stated that the discovery of a fifth satellite to Jupiter has caused astronomers to turn their attention to the giant planet of our system, and many who have not made astronomy a special study are more interested in Jupiter's system than they have usually been in the past. Four moons have been known since Galileo's time, and they have been so easily seen that no one has appeared to suspect that any other existed—at least until about two years ago. When we speak, now, however, of the moons of Jupiter we know there are five, and we suspect there may be more. Their distances from the planet's centre, expressed in radii of the planet, are as follows:—

RADII.		MILES.
V.	2½	112,000
1.	6	267,000
2.	9	425,000
3.	15	678,000
4.	24	1,192,000

It will be observed that by adding the distance of the inner satellite to the next in order, we get the distance of the next, and so on throughout the series. He thought this could not be a matter of chance, but he was not able to point out the cause. The rates of the satellites in their orbits have also a peculiar feature, the most distant one, the IV., moves but half as fast as the one next inside itself, and so on throughout the series. The velocity of No. IV. is one mile per second.

NO.	MILES.
III	2
II	4
I	8
V	16

He left these facts with his hearers and requested them to seek the cause. In relation to the shape of the satellites he thought that the strong tidal action of the mighty planet would be so great that they

would be drawn out into ellipses. Secchi, Daws, and the Lick observers have seen them occasionally of this form. Satellite I. has been sometimes seen apparently double, more light being reflected from near the ends than at the centre of the ellipse.

Mr. Elvins referred to many observations of satellites, when near the limb of Jupiter, having been seen to disappear and reappear, etc. He explained this by supposing the light to undergo refraction in passing through gaseous matter recently thrown from the planet and moving in orbits near the primary. He thought it probable that all the satellites were originally thrown from the planets by the combined action of the tangential force caused by the planets' rotation, the molecular motion of the gases in the atmosphere of the planet, and by projected matter thrown from the Jovian volcanoes into space.

SIXTH MEETING.

Sixth Meeting, 10th December, 1892, the President in the chair.

Donations and Exchanges, 58.

Dr. A. F. Chamberlain was appointed delegate to attend the meeting of the American Folk-Lore Society, at Boston, on the 28th December.

The following were elected members: Prof. James Mavor, W. H. P. Clement and Joseph Antisell Allen.

Mr. A. F. Hunter, M.A., read a paper on "British Immigration into Upper Canada, 1825-1837." The population of Upper Canada at the close of the war of 1812–14 was less than 100,000. This had increased fourfold by the time of the outbreak of the rebellion of 1837, the increase having been chiefly due to British immigration. Amongst the causes that produced this rapid influx of immigrants during the period were these:—1. Attention in Britain was turned towards Upper Canada by many books of travel, the writers of which visited the country and published their travels on returning home. No other period has yielded so much literature relating to the country and its resources. 2. The free grant land policy was adopted here at an earlier date than in some of the States. Besides this, an order-in-council in 1818, imposing settlement duties on the U. E. Loyalists, militia, discharged officers and soldiers, pensioners, and all others receiving free grant lands after that date, had the effect of preventing them from holding land on speculation, and thus stimulated settlement. 3. At the passage of the Catholic Emancipation bill in 1829, despondency fell upon the Irish Protestant

peasantry of Ulster, and large numbers of them emigrated. 4. The slavery agitation in 1832 had previously produced in Britain a feeling of hostility to the West Indies, and one of favourable regard for Upper Canada, where slavery had been abolished in 1793. 5. The industrial agitations from 1818 till 1834, including Chartist riots, besides radical and anti-radical risings, forced large numbers to emigrate from the industrial centres of Glasgow and Manchester. 6. The cholera in 1832. Instances were cited of settlements formed in this province by these causes. The immigrants chiefly settled in groups, according to their nationalities, each group giving to the district it occupies the political and social features that still cling there, though it can be observed that modern methods of communication and travel are fusing the different races into a distinct Canadian nation.

Mr. Hunter also read a paper on "The Site of the Mission of Ste. Marie on the Wye; Its Possessors and Present Condition." In this paper Mr. Hunter deplored the lack of attention paid generally to historic ruins in Canada, and in particular to this old French fort of 1639 in the County of Simcoe, which is now in a neglected condition. Two years ago Mr. Boyle had suggested in his annual report that steps be taken to buy the land around the place for the use of the public, and erect a tablet setting forth in a few words the history of the spot. Hitherto, however, nothing had been done in the direction proposed. The paper gave an account of the present ownership of the site, as it is recorded in the Registry Office of the County of Simcoe at Barrie. For nearly fifty years a part of the land, on account of its associations with the early Jesuit missionaries, has been in the possession of priests of that order. The condition of the ruins has greatly changed since Europeans first settled in the neighbourhood. An account of the place, written by Rev. Felix Martin, who visited it in 1845, was read to illustrate its former condition. This is probably the earliest of modern accounts, and from it the walls are known to have been much higher then than now. As the duty of guarding the place from even further destruction belongs to the French of Quebec Province as well as to the people of Ontario, it was suggested that an appeal be made to the Governments, Dominion or Provincial, to make some provision for its preservation.

SEVENTH MEETING.

Seventh Meeting, 17th December, 1892, the President in the chair.

Mr. J. C. Hamilton was appointed a second delegate to attend the meeting of the American Folk-Lore Society.

Donations and Exchanges, 66.

Dr. Sandford Fleming read a paper on "Ocean Steam Navigation."

The following resolution was moved by Dr. Fleming, seconded by Mr. Kivas Tully, and adopted :—

"Resolved, That the subject of the 'Pioneer Ocean Steamship' having been brought to the consideration of the Canadian Institute at its meeting held in Toronto on Saturday, December 17th, 1892, it is resolved that suitable measures be taken to establish a memorial tablet in honour of the men associated with the building and sending to sea of the Royal William, in August, 1833, and that the members for the city of Toronto be requested to obtain permission for the tablet to be placed in a fit position in the Parliament buildings at Ottawa; and that it be remitted to the Council to invite the co-operation of societies or individuals, and to take such other means as may be needful, to carry out in the best manner the spirit of this resolution."

Dr. Fleming also read a paper on "Early Steamboats," after which the following resolution was adopted :—

"Resolved, That the matter of the first steamboat constructed in Canada be remitted to the Council, with the request that they will consider the propriety of dealing with it in a similar manner to that set forth in the resolution passed by the Institute to-day with respect to the Royal William."

Dr. Fleming then read a paper on "Postage Stamps," when on motion by Mr. W. H. Merritt, seconded by Mr. J. C. Hamilton, it was

"Resolved, That the Institute having heard with great pleasure the paper read by Dr. Fleming on 'Postage Stamps,' requests the Council to take into their earnest consideration the points suggested by the paper."

EIGHTH MEETING.

Eighth Meeting, 7th January, 1893, the President in the chair.

Donations and Exchanges, 133.

W. H. Brouse and F. A. Fleming were elected members.

A report was read from Dr. A. F. Chamberlain, delegate from the Institute to the annual meeting of the American Folk-Lore Society, held at Boston, December 28th and 29th, 1892. The report stated that the

meeting was very successful and well attended by members from the United States and Canada. Five of the papers read were contributed by Canadians, and among the officers elected for next year three were Canadians, the President being Mr. Horatio Hale, of Clinton, Ont., justly celebrated for his distinguished attainments in philology, anthropology, folk-lore, and kindred subjects. The next meeting of the society will be held in Montreal.

An announcement was read from the Committee on Communications of the Anthropological Society of Washington, giving a statement of the objects of that society and its programme for the current year.

Mr. James Bain, Jr., then read on behalf of Captain Ernest Cruikshank, of Fort Erie, a paper on "Captain Walter Butler and the journal of his voyage along the north shore of Lake Ontario in 1779."

The journal was accompanied by a memoir of Butler by Capt. Cruikshank, in which his military career was traced from the beginning of the American revolution until his death in battle in the autumn of 1781.

After the reading of Capt. Cruikshank's paper Mr. Bain read, by way of appendix, some extracts from the journal of Major Robert Rogers along the north shore of Lake Ontario in 1760. In the part of the journal in which he relates his visit to Toronto, as the river and old French fort were then called, Major Rogers makes the remark, "I think Toronto a most convenient place for a factory, and that from thence we may very easily settle the north side of Lake Erie."

NINTH MEETING.

Ninth Meeting, 14th January, 1893, the President in the chair.

Donations and Exchanges, 45.

Mr. Emerson Coatsworth, Jr., M.P., was elected a member.

Mr. J. C. Hamilton, LL.B., read a paper entitled, "The Algonquins of the Georgian Bay; Assikinack, a Warrior of the Odahwas," of which the following is a summary :—

Mr. Hamilton showed from statistics furnished by the Indian Department that the number of Indians of Ontario and Quebec was in 1891 about 26,600, and that they have increased by 25 per cent. in the preceding 25 years. The aborigines of the Georgian Bay district are of Algonquin tribes, Ojibewas, Ottawas, Mississagas, and Pottawatamies. The population of the Northern Ontario superintendency was in 1886, 3,343.

They held 3,120 acres under cultivation. Their crops were 4,269 bushels of grain and 1,300 tons of hay. The fish taken by them were valued at $18,500 and furs at $5,205, and their revenue from other sources was $5,850. The charter under which the Canadian Indians claim their rights is the Royal proclamation of King George III. in 1763, after the Treaty of Paris. Their lands were to be alienated only at public meetings presided over by the governor or his deputy. Care and control over them is exercised by the Dominion Government. The Algonquins of Lake Huron and Georgian Bay are divided into fifteen bands, settled on as many reserves on the shores of lake and bay. Most of them are now Christians, but a remnant of the old superstition is often found lingering among them. They meet yearly on a chosen place to dance and shoot Matci Manito, the evil spirit. They live in tribes, the regulation of their affairs being in the hands of councils chosen by themselves; the oldest system of government on the continent is in operation in their council houses. Their code of rules, when adopted and approved by the Governor-General, forms an excellent quasi-municipal system, including the management of roads, fences, schools, and pounds. They exhibit laudable interest in education and have many Public schools, and also send many of the children to the Roman Catholic schools and convent at Wikwemikong, on Manitoulin Island, and to the Protestant Shingwauk and Wawanosh Homes at the Sault Ste. Marie. Mr. Hamilton then gave an interesting account of several famous Indians of this region; of Chingalacose, the Small Pine, the noted Chippewa chief who aided Capt. Roberts in taking Fort Mackinack in 1812, and was afterwards for many years leader of his tribe in their wars with the Sioux, but was converted to Christianity under the ministration of Rev. Dr. McMurray when missionary at Sault Ste. Marie. His son, Augustine Shingwauk, gave his name and aid to the Home there established for the education of Indian children. Assikinack was a noted Ottawa chief, and under the name of the "Black Bird" figured at the taking of Fort Dearborn in 1812, and in the defence of Mackinack from American attack in 1814

His son Francis was, in 1840, when a lad, brought to Upper Canada College, where he developed good scholarly powers, and attained high places in his classes. He became Indian interpreter to the department, and in 1858 and 1859 read several learned papers before the Canadian Institute as to Indian history and customs. He unfortunately died in 1863. Mr. Hamilton then discussed the "Manaboyho" legends, and showed that these, as found in various forms among our Algonquins, are the substance of the "Song of Hiawatha," which latter name is the Onondaga or Iroquois name for the same demigod or national hero. Several

places along our north shore still retain the name of Manaboyho or Nakibozhu, among these an island in Michipicotin Bay, which is his fabled burial place. Mr. Longfellow lays the plot of his song on the south shore of Lake Superior, but the Chippewas, Ottawas, and many other of the nations named, and the customs and lore described, relate quite as much to the Algonquins of our north shores. The paper concluded by giving abstracts of a few interesting myths, or legends, related by young Assikinack when in Toronto, and which he had learned from his father and other learned men of his nation on the Great Manitoulin Island, where the brave old warrior and his talented son lie now side by side in their last resting place at Wikwemikong.

TENTH MEETING.

Tenth Meeting, 21st January, 1893, the President in the chair.

Donations and Exchanges, 93.

A communication was read from the Royal Academy of Sciences of Turin respecting the ninth Bressa prize, to which, according to the testator's will, scientific men and inventors of all nations will be admitted. A prize will be given to the scientific author or inventor, whatever be his nationality, who during the years 1891-94, "according to the judgment of the Royal Academy of Sciences of Turin, shall have made the most important and useful discovery, or published the most valuable work on physical and experimental science, natural history, mathematics, chemistry, physiology, and pathology, as well as geology, history, geography, and statistics." The sum fixed for the prize, deducting the income tax, will be 10,416 francs.

Mr. Edward Meek read a paper entitled "Lessons from the Times and Teachings of Cicero." The lessons drawn from the times were "political" —using the word in a general sense—teaching the causes which contributed to produce the condition of the Roman Commonwealth as it existed in the age of Cicero, its subsequent dissolution, the overthrow of democratic government, and the establishment of imperial military rule. As war was the chief business of the nation, the successful generals became the greatest men—the popular idols. The people gradually turned their attention, and transferred their allegiance from the Senate and magistrates, to the generals of the armies. The Senate, from the foregoing and other causes, lost its control of the popular mind and over the popular leaders. These leaders began to contend with each other for

the mastery. The strongest and most fortunate ultimately became supreme. Julius Caesar was thus produced and the old constitution and senatorial supremacy expired. The second part of the paper was devoted to "Lessons from the Teachings of Cicero," quoted largely from those writings of Cicero which teach and discuss the moral duties.

ELEVENTH MEETING.

Eleventh Meeting, 28th January, 1893, the President in the chair.

Donations and Exchanges, 33.

Mr. Alan Macdougall, C.E., and Mr. James Bain, Jr., were appointed representatives on the Board of the Industrial Exhibition Association.

Rev. Philip Tocque, A.M., read a paper on "The Great Fires of St. John's, Newfoundland, from 1816."

TWELFTH MEETING.

Twelfth Meeting, 4th February, 1893, the President in the chair.

Donations and Exchanges, 53.

R. N. Wilson, of Fort McLeod, Alberta, was elected a member.

Mr. W. A. Sherwood read a paper on "Hindrances to American Art." He said there could be no phase of art thought more difficult to grasp than that which fell to his lot that evening to discourse upon. Long before the revolution, to the very foundation of colonial life, might well be traced the fundamental basis of "Hindrances to American Art." The Puritans, justly indignant at the licentious character of the English court, carried their dislike to the utmost verge of practice. , Painting, royally encouraged in the palace of the Stuarts, fell a victim, like many sister arts, to the contempt of the new colonists. Their homes and places of worship were absolutely free from every kind of decoration. Thus, through a whole century we could pass without any advancement along the line of art. Indeed, the only semblance to adornment was to be found in the basket work painted by the aborigines. In the next century the same condition continued to exist, although, indeed, marked by the birth of Benjamin West. Those of them who were familiar with the biography of early American painters had but to recall that amusing incident of West appearing before the fathers of the Church to answer

for his conduct. After much prayer and pleading young West was permitted to practise his art, yet from the indifference and lack of patronage he, who might have laid the foundation of American art, was forced to make a royal retreat and find his home in England. The dawn of the Republic was characterized by no art movement. From the great tide of immigration one would expect at the time an absolute change of front, but what were the conditions of to-day, and what were the causes? A brief analysis, he thought, would suffice. The German immigrant, for instance, though rapidly adopting new political principles, still cherished fondly the early impressions made upon him in his native land. Industrious, toiling, of thrifty habits, he soon acquired a fair amount of wealth. The children visited the home of their fathers, and the great art galleries of their old land became all in all to them. They returned deeply impressed with a love for pure German art; nothing American in art for them. The same may be justly said of the descendants of every nationality. From such a condition what hope to evolve an American art? The art of the nation ought to reflect the thought of the nation, being in touch with the varying phases of light and shade through which the nation is passing. The art of mediæval times formed a great chapter in the book of history, and gave an insight into the mode of thought which engrossed the middle ages. It was purely European, inferior to the work of later centuries, yet invaluable from its native and primitive character. It was historical. If Canadians hoped to have a native art they must insist upon treating it from some national point of view. Then as the centuries passed a distinctive character would unfold itself, embodying and marking and reflecting the thought of the people in its varied development. While the thought expressed by speech and writing lives long, it does not survive that represented and expressed on polished marble, imperishable fresco, and the canvas on which genius has imprinted its sublime ideals. Art is the great conservator of thought. It lives and shines forth in its might when books are forgotten and the names of earth's great writers are become obscure. This is an age of light. The dim lighted cathedral is a thing of the past, the dread wizard of the cave has been transformed into an angel of light, and the magic wand into a sceptre of righteousness. It is an age electric. Art should reflect it—brilliant, varying with every phase of thought, and without any trace so far as subject is concerned of foreign thought.

THIRTEENTH MEETING.

Thirteenth Meeting, 11th February, 1893, the President in the chair.

The following Note on the life and works of M. l'Abbè Provancher, by Julie Julien, was read :—Mr. l'Abbè Leon Provancher was born in Becancourt, near Three Rivers, on the 10th of March, 1820. He was ordained priest at Quebec on the 12th of September, 1844. Since 1862 he has devoted all his time to the study of natural history. He began then the publication of the "Naturaliste Canadien." His principal works are: "Traite èlèmentaire de Botanique," illustrated, 1858; "Flore du Canada," 1862; Le "Verger," "Potager," et le "Parterre," 1874; Faune Entomologique du Canada, Les Coleoptaires, 1877, avec supplements, Ortopteres, Neuroptères, Hymenoptères, 1883; Additions aux Hymenoptères, 1889; Les Hémiptères, 1889. He also published accounts of his travels: "De Quebec à Jerusalem," 1884; "Une Excursion aux pays Tropicaux," "Abrégé de l'Histoire du Canada," 1884; "Les Mollusques de la Province de Quebec," "Les Univalves." He began writing a study on the "Culture of Ornamental Plants," but unfortunately could not terminate his work before his death, that occurred on the 23rd March, 1892, deeply regretted by his sorrowful relatives and by all the lovers of natural history.

Professor Coleman read a paper on "New Trails in the Rockies from the Saskatchewan to the Arthabasca."

Dr. Sandford Fleming read a paper on "The Abolition of the Astronomical Day," also a paper on "A Memorable Epoch in Canadian History," also a paper on "Canadian Historical Pictures."

The following resolutions were passed :—

That the Canadian Institute heartily welcomes and accepts the proffered aid of the Astronomical and Physical Society of Toronto in its work of Time Reform, and requests the Council of the Institute to appoint a committee of three to co-operate with a similar committee of the Astronomical and Physical Society in bringing about the assimilation of astronomical and civil time. The Canadian Institute suggests that the two committees act as a joint committee with equal voting power, and further, that Sandford Fleming, Esq., C.M.G., LL.D., etc., who is a member of both societies, be chairman of the joint committee, with power to decide any difference of opinion which may arise.

That Dr. Fleming's paper on Canadian Historical Pictures be referred to a committee consisting of Messrs. Howland, Forster, Sherwood, Tully and Hamilton, to consider and report to the Council at its next meeting

some plan whereby the proposals mentioned in the paper may be accomplished. That it be an instruction to the Committee on Canadian Historical Pictures to consider the best manner of raising means to obtain a historical painting to commemorate the arrival of Sir Alexander MacKenzie on the Pacific Coast on July 22nd, 1793, after his memorable discoveries and the completion of the first transcontinental journey by any civilized man, and it be suggested to the committee that artists should be invited to submit proposals to the Institute on the 22nd July next.

FOURTEENTH MEETING.

Fourteenth Meeting, 18th February, 1893, the President in the chair.

An interim report from the Committee on Historical Pictures was read.

Donations and Exchanges, 56.

G. M. M. Martin was elected a member.

Mr. L. J. Clark read a paper on "The Breaking of the Conduit," illustrated by drawings on the blackboard.

FIFTEENTH MEETING.

Fifteenth Meeting, 25th February, 1893, the President in the chair.

Donations and Exchanges, 77.

T. Mower Martin, R.C.A., was elected a member.

A paper by Capt. Ernest Cruikshank was read on "Traders and Trade Routes in Canada, 1760-1800" (second paper).

SIXTEENTH MEETING.

Sixteenth Meeting, 4th March, 1893, the President in the chair.

Donations and Exchanges, 70.

E. Herbert Adams, M.D., was elected a member.

The following resolutions were passed:—

That clause 2 of the first section of the by-laws be hereby suspended, and that the Council be requested forthwith to make a selection of ladies

and gentlemen whose co-operation in the work of the Institute is desirable, and to send to them a circular letter explaining its aims and needs, following the same by personal application, paying for such services in the premises according to such a scale as they may see fit, and commissioning such persons as they may appoint to receive the fees and such donations for specific purposes as may be given; the work to be continuously followed up, and reports of progress to be made as often as possible.

That the thanks of the Institute be given to Lt.-Col. F. C. Denison, M. P., for the interest he has taken and the work he has achieved in moving the government to take steps to protect and preserve the old French stone magazine in Fort George, Niagara.

Mr. Andrew Elvins read a paper on "The Satellites of Jupiter."

Dr. A. M. Rosebrugh read a paper on "The Child Problem."

SEVENTEENTH MEETING.

Seventeenth Meeting, 11th March, 1893, the President in the chair.

Donations and Exchanges, 32.

Hon. G. W. Ross was elected an honorary member, Dr. Eden Walker, of New Westminster, B.C., a corresponding member for a period of three years, and Mr. W. Spry, C.E., P.L.S., of Toronto, an associate member.

The Secretary was instructed to send a congratulatory letter to the Lundy's Lane Historical Society on the recovery of the parish records of the parish of Welland from 1820 to 1835, and to ask for a short description of their contents, and where and how the records were found.

Mr. J. W. L. Forster read a paper on "Artists—their Educational Privileges and Professional Rights." He directed attention to the good fortune of the artisan and agriculturist, who each enjoyed technical and scientific education, to the culture given the architect, engineer, solicitor, and practitioner, and asked:—Shall the skilful and distinguished practice of art forever limit itself to the studio and the field? Shall it not allow itself, shall it not prepare itself, to mingle and associate with scholarship in a congenial and eminent fellowship? In close kinship to this question was another:—Shall not art in its approved pursuit have an acknowledged place amongst the learned and honourable professions? These questions formed the text, so to speak, of his paper. He pleaded in the interest of the latter question reliable expert evidence in courts of law,

and the saving of great cost to litigants and to the country, etc. The greater part of the paper was devoted to the educational question, in discussing which he quoted what is being done in France and Belgium, where the machinery of governments and the faculties of the universities are utilized to carry forward broad and thorough systems of instruction, and where examinations are so directed as to give artists an intellectual standing appropriate with the place art holds amongst the liberal professions. Neither the intention nor the effect has ever been to draw away the mind of the artist from his chalk and models; but by so enriching his mind with the stores of information that apply directly to his work, by uncovering to him the wells of scientific truth that will correct his judgment and give permanence to his work, by unrolling the scrolls of history, and by teaching to him the ethics of art equip him for high achievement and honourable renown. The list of options for college and university course for artists was then sketched. And the course for fine art degrees in several American universities was given as taking up only a small portion of work that was of real value, and for which the machinery of our university is already fairly well adjusted Ontario does not generally wait for her neighbours to lead, especially in the field of education.

EIGHTEENTH MEETING.

Eighteenth Meeting, 18th March, 1893, the President in the chair.

Donations and Exchanges, 80.

A letter was read from Rev. Canon Bull, President of the Lundy's Lane Historical Society, giving an interesting account of the recent discovery of an old church register at Chippewa, together with many important papers. The reverend gentleman is now endeavouring to make a duplicate of this register, and also to write out the papers in order. An important marriage license, with clergyman's endorsation of Nov. 28, 1839, has been found, of which there was no entry in the parish register. This document appears to be of very great value, as it supplies evidence for which long enquiry had been made.

A paper by Dr. Sandford Fleming on "Early Ocean Steamships" was read. It confuted the statements made by Professor Watkins, in the report of the United States National Museums for 1890, in regard to the claims of the Savannah to be the first steamship to cross the Atlantic.

Mr. Alan Macdougall read a paper on "Electro-Horticulture." He stated he had watched shade trees in a number of streets in early spring

and in the fall, and could find no forcing effect from the electric light Trees away from the lights seemed earlier: north and south streets were earlier than those running east and west. The subject had been under study at Cornell University for the past three years. The reports say the naked light when placed near plants injures them; a clear glass, even a pane of glass, is beneficial, and opal globes give best results. Plants which are much injured under a naked light may be benefited under a protected one. As a rule, plants under the electric light in forcing houses mature earlier than in the dark house. Lettuce can be hastened from seven to ten days by only five hours of light per night. Radishes, beets, spinach, cauliflower are slightly benefited. Certain kinds of flowers are also benefited, and plants which are benefited seem to grow more rapidly during the customary period. The researches point to a likelihood of electric light being advantageous for forcing plants for the market.

Mr. D. W. Beadle, B.A., LL.B., read a paper on "Danger menacing our Pear Orchards from an invasion of Psylla Pyricola."

NINETEENTH MEETING.

Nineteenth Meeting, 25th March, 1893, the President in the chair.

Donations and Exchanges, 46.

Messrs. J. G. Ridout and E. B. Lefroy were appointed auditors.

Mr. William Houston, M.A., read a paper on "The Laurentian Region of Ontario." After discussing the extent of the region, its physical character, geological and geographical features, and resources, he showed its unsuitability for agricultural purposes, and advocated setting it aside as a great national park.

He concluded by making the following suggestions:—

1. All free granting of land within that region should be at once and forever abandoned.

2. Some policy should be adopted with a view to securing the reinvestment of abandoned lands in the Crown.

3. So soon as they are reacquired steps should be taken to have them reforested.

4. Additional measures should be taken to secure the preservation of game.

5. The Legislature should exercise some control over the waste caused by destructive lumbering operations.

6. Access to the interior of the region should be facilitated.

TWENTIETH MEETING.

Twentieth Meeting, 1st April, 1893, the President in the chair.

Donations and Exchanges, 71.

Dr. Henry Hunt was elected a member.

A paper by Rev. Dr. MacNish was read on "The present aspect of the Ossianic Controversy."

The following resolution was passed on motion of Mr. W. Hamilton Merritt, seconded by Mr. T. R. Clougher:—

"That one of the greatest benefits to commercial progress has been attained by the advances made in the manufacture of steel, especially by the Bessemer process, and that in Britain, the United States, and other countries where smelting works are in operation, they have had direct influence on the prosperity of the country; Be it resolved,—that the attention of the Provincial Government be directed to the advantages to accrue to the province by the construction of smelting works for our iron ores, and that a committee be appointed to wait upon the Government and request it to consider such means as in their opinion will aid in developing our iron deposits by the erection of smelting works."

Prof. Coleman and Messrs. Merritt, Clougher and Bain were named a committee in accordance with the resolution.

TWENTY-FIRST MEETING.

Twenty-first Meeting, 8th April, 1893, the President in the chair.

Donations and Exchanges, 55.

Messrs. Allan Cassels, Thomas W. Gibson, H. Maughan, Robert Percy Vincent, and A. L. Hoyles were elected members.

Mr. D. W. Beadle, B.A., LL.B., read a paper entitled "Danger of Introducing a very serious Pest destructive of our Peach Orchards."

Mr. Andrew Elvins read a paper on the Satellites of Jupiter, supplementary to one previously read on the same subject. He called attention to the fact that the period of the revolution of each of the satellites was double that of the next interior one, in accordance with Kepler's law. Thus, the satellite farthest from the planet is about 352 hours, the next nearer the planet is 176 hours, the next 88, and the next is 44, while the newly-discovered satellite revolved in 11 hours, or one-fourth that of the next exterior satellite. This discrepancy rendered it probable

that a satellite existed between the two latter, which revolved round its primary in about 22 hours. Mr. Elvins recommended astronomers to carefully search this space, as it was likely their labours would be rewarded by the discovery of a sixth satellite, revolving in accordance with Kepler's law.

Mr. Elvins closed thus:—"Reasoning in this manner, I ventured to suggest that it would be well to watch Jupiter closely during the opposition of 1892. My paper was read in May, 1891, and published in February, 1892, in the "Transactions of the Astronomical and Physical Society" of Toronto, and I wrote our local observers to look for satellites, or rings, which would doubtless be very faint, but would possibly be seen. I wrote Prof. Barnard, among others, and this reply, which I lay on the table, shows he received it. Whether that letter stimulated him to search for satellites or not, he has not stated. One thing is certain, he has made a diligent search and a fifth satellite being discovered has rewarded his pains. The French Academy of Science has tendered Prof. Barnard a double prize, a token of merit which he richly deserves. But had he mentioned the fact that I had suggested the possibility of the existence of a new satellite, the lustre of his discovery would not have been dimmed, and he would have been doing justice to one who has been a lover of the stars through a life which is now rapidly drawing to a close."

TWENTY-SECOND MEETING.

Twenty-second Meeting, 15th April, 1893, the President in the chair.

Donations and Exchanges, 85.

Messrs. C. P. Smith, Clarence E. Spink and G. K. Powell were elected members.

Prof. A. B. Macallum read a paper on "Archic Life."

TWENTY-THIRD MEETING.

Twenty-third Meeting, 22nd April, 1893, the President in the chair.

Donations and Exchanges, 57.

A circular from the Royal Society of Canada, transmitting copies of a schedule for the recording of observations in Natural History and Meteorology was referred to the Biological Section.

Mr. J. J. Foy and Rev. J. J. Hare, Ph.D., were elected members.

Mr. Alan Macdougall read a paper on "Road Improvement."

TWENTY-FOURTH MEETING.

Twenty-fourth Meeting, 29th April, 1893, the President in the chair.

Donations and Exchanges, 64.

Nominations for officers for the ensuing year were made.

The following gentlemen were elected members:—Messrs. E. B. Osler, Paul Campbell, George Williams, Charles P. Sparling, S. N. Samuelson and Oliver Spanner.

On motion by Mr. G. G. Pursey, seconded by Mr. C. Armstrong, it was resolved that the Public school teachers be requested to impress on their pupils, when they are gathering wild flowers, to be careful to pluck the flowers only and leave the roots undisturbed, and that the press be requested to give this resolution wide circulation.

Mr. Arthur Harvey read a paper entitled "The Outlook from Mount McKay," Mount McKay being one of the great hills which meet the view as the traveller enters Thunder Bay, on Lake Superior. The features of the territory overlooked by the mountain, the geography, topography, geology, were described and discussed by Mr. Harvey, and some practical suggestions were thrown out as to the development of the rich resources of the country.

FORTY-FOURTH ANNUAL MEETING.

The Forty-Fourth Annual Meeting was held on 6th May, 1893, the President in the chair.

Donations and Exchanges, 60.

The following were elected members:—Mr. Frederick Wyld, Mr. Thomas McCraken, Mr. John Chambers, Mrs. Alexander Cameron, Miss Bertha M. Shoults, and Miss Lilian C. Harrington.

President Harvey addressed the Secretary, Mr. Alan Macdougall, as follows:—"Some members of the Canadian Institute who admire the urbanity and tact with which you discharge the duties of the secretary-hip desire to present you with a token of their appreciation of your services and of their high personal regard. It is my pleasing duty to carry out their wish by handing you, in the name of the Institute, a silver inkstand with a short inscription." Mr. Macdougall replied.

The Forty-fourth Annual Report was read and adopted.

Professor Mavor was empowered to act as delegate from the Canadian Institute to the next meeting of the British Association for the Advancement of Science.

The officers of the Institute for the ensuing year were elected as follows:—President, Prof. R. Ramsay Wright, M.A., B.Sc.; First Vice-President, Mr. J. C. Hamilton, LL.B.; Second Vice-President, Mr. B. E. Walker; Secretary, Mr. Alan Macdougall, C.E.; Treasurer, Mr. James Bain, Jr.; Librarian, Mr. D. R. Keys, M.A.; Curator, Mr. David Boyle, Ph.B.; Editor, Mr. George Kennedy, M.A., LL.D.; Members of Council—Mr. J. Maughan, chairman of the Biological Section; Prof. Coleman, Ph.D., chairman of the Geological and Mining Section; W. Canniff, M.D, chairman of the Historical Section; and Mr. O. A. Howland, Mr. Arthur Harvey, Mr. Levi J. Clark.

A vote of thanks was tendered to the retiring President, Mr. Arthur Harvey, for his indefatigable labours in the service of the Institute during his term of office; also to the several officers for the faithful and efficient discharge of their duties during the past year. It was then resolved that the thanks of the Institute be tendered to the city press for their excellent reports of the proceedings of the Institute and its sections, and that a copy of this resolution be sent to each of the papers.

FORTY-FOURTH ANNUAL REPORT.

The Council of the Canadian Institute has the honour to lay before its members its Forty-fourth Annual Report.

The session which has closed compares favourably with past years in the number of papers read, the attendance at the meetings and the interest taken by members in the work of the Institute.

Twenty-four ordinary meetings were held, at which thirty-four papers were read. The work of the several sections was well maintained; the natural history or biological section, with its sub-sections, held twenty-seven meetings; the historical section six, and the geological and mining, six meetings.

The membership has increased by the election of twenty-five members, sixteen associate members and three juniors.

One honourary member and four corresponding members have been elected, the periods of election of the latter ranging from three to five years.

The Institute announces with much regret the death of several valued members.

Sir Daniel Wilson, LL.D., F.R.S.E., etc., President of Toronto University, an honorary member, during his long and valuable life, rendered marked assistance to the Institute, and occupied the Presidential chair in 1859-60, 1860-61, and 1878-80.

Nelson G. Bigelow, Q.C., LL.D., M.P.P., a life member, did not take a great interest in the work of the Institute in later years; his death was sudden at the end.

His Honour Sir Alexander Campbell, K.C.M.G., Lieutenant-Governor of the Province, was prevented by his official position and duties from taking a very active part in our work.

D. A. O'Sullivan, LL.D., was a frequent contributor to our meetings; his health of late years prevented his attending very regularly.

The re-arrangement of the rooms in the building, which has recently been effected, has proved very successful. The library, which was formerly hardly ever used, is now the general reading room; the spacious apartment affords ample accommodation for the comfort of the members. The acquisition of the reading room on the ground floor has enabled the natural history section to bring its collections together in a very convenient form for reference and study.

The conditions for the competition for papers on Electoral Representation and the Rectification of Parliament have been widely distributed. The competition closes on the 1st of July.

The centennial celebration of the formation of the Province of Upper Canada, and the institution of parliamentary government, was celebrated with great enthusiasm at Niagara on the 16th of July. This was followed by fitting ceremonies in Toronto on the 17th September, the centennial anniversary of the meeting of the first parliament, and the hundredth parliament was opened on the 5th of April with the state and ceremony which befitted the important occasion. The Institute was well represented on both occasions.

The report of the Provincial Commission on the Algonquin Park for the preservation of wild animals and the forest has been issued, and a bill to establish the park has been introduced into the Legislature by the Hon. Commissioner of Crown Lands. It is gratifying to find in this report the completed design which emanated from the Institute, and in which the Institute has never failed to take a deep interest.

The Council has pleasure in announcing that through the efforts of one of our city members, Lt.-Col. F. C. Denison, C.M.G., M.P., and the Hon. Senator Lougheed, the grounds and ruins of old Fort George at Niagara are to be preserved and cared for by the Government.

Action was taken by the Council in accordance with resolutions passed at the meetings, to secure some commemoration of the crossing of the Atlantic by the first steamer, in 1833. Dr. Sandford Fleming has proved conclusively that the Canadian steamer Royal William was the first to steam all the way across. The Government will probably erect a tablet to commemorate the event. A model of the vessel is being exhibited at the World's Columbian Exposition, and public documents relating to the crossing distributed to the public. The log of the Savannah, which has recently been published, proves that she steamed only in calm weather, and out of 29 days, 11 hours at sea, she steamed altogether only 3 days, 8 hours.

A joint committee of the Institute and Astronomical and Physica Society has prepared a circular to be sent to all the observatories and astronomers asking their opinions regarding a change in time reckoning, whereby the astronomical and civil day shall begin at mean midnight, and suggesting that the change shall be inaugurated in 1901.

The Institute was requested by the several provincial universities and McGill, Montreal, to send an invitation to the British Association for the Advancement of Science, to hold its meeting in 1895 in Toronto. The proposal was favourably received by the Provincial Government; the Dominion Government did not entertain the proposal on the basis set forth in our petition; negotiations are still pending, which it is hoped may terminate favourably to the prayer of the Institute, and result in the desired grant being made.

The appeal of the Institute to leading citizens for aid, and an increased membership has been widely disseminated; it is being followed up by a personal presentation of the claims of the Institute.

The Institute again acknowledges its indebtedness to the generosity of the Government in enabling it to continue its archæological work.

The report of the Curator will be found as full as ever of interesting matter. The report is being printed as an appendix to the annual report of the Hon. Minister of Education.

The thanks of the Institute are due and are tendered to Messrs. Cockburn, Denison, and Coatsworth, M. P.'s for the City of Toronto, for many services rendered during the last session; and to the CITY PRESS for full reports of our meetings.

The Treasurer's accounts have been audited and found correct. They will be found in Appendix I.

The report of the Librarian is given in full in Appendix III. It will be seen that the additions to the library continue to be numerous and valuable.

The reports of the Sections are given in the Appendices IV., V. and VI.

The Council acknowledges with pleasure the services rendered to the Institute by Mr. R. W. Young, M.A., Assistant Secretary.

All of which is respectfully submitted.

ARTHUR HARVEY,
President.

ALAN MACDOUGALL,
Secretary.

TORONTO, 29th April, 1893.

N.B.—The Appendices have been printed in full as a supplement to the Annual Report of the Hon. the Minister of Education.

SOCIAL ORGANIZATION OF THE BLACKFOOT INDIANS.

By Rev. John Maclean, M.A., Ph.D.

(*Read 19th November, 1892.*)

The Blackfoot Confederacy is named by the three tribes comprising it, Sâketûpĭks, *the People of the Plains*, and Netsepoye, *the People that Speak the Same Language.* It is the custom amongst the mounted police and settlers in Alberta, where the three tribes are located, to speak of the Confederacy as simply the Blackfeet, and to name each gens after the chief of the gens. The natives follow their own customs, calling each gens by its own distinctive name, recognizing the fact that the chiefs may be removed by death and other causes, which would change the names; but by following their own native method, the names of the gentes are always retained. The Blood Indians are called *Kaina*, a name not definitely understood, but from all I could gather from the old men in the camps, it is derived from *Aikaie, an old robe*, and the application of this name to the tribe means that the people at one period in their history wore old robes, which were well-nigh useless, and it was at that time and because of that circumstance that they were thus named. This tribe is also named *Aapaitûpĭ*, Blood people, and Sûmûkegtûqkûnema, and Sûmûkena, which mean that these people had large knives with which they fought.

The Piegan tribe is named in the Blackfoot tongue Pikûnĭ, singular Pikûnĭkwan, which is derived from Apikûni, meaning a half-dressed hide of the buffalo. The Indians say that there was a period in the history of the Confederacy when the Piegans were compelled through poverty to dress themselves in buffalo robes, which were badly tanned and almost worthless as an article of clothing.

The Blackfoot tribe is called Siksikauo, meaning Blackfeet. The singular number has always the personal termination *kwân*, thus Siksĭ-kaikwân = a Blackfoot Indian. It is a compound word made from the combination of Siksĭnûm, Black, and Oqkûts, his foot. We have the adjectival particle Siksĭ, the noun particles *kai* and *kaw*, and the personal termination *kwan*, which completes the word. There are two meanings given to this name, that is, as to its origin. The Indians have told me

repeatedly that the name referred to a period when the prairie was burned, leaving the ground black and dry. As the Indians travelled over the prairie their moccasins became black and they were named by the tribes adjacent Blackfeet. Jerry Potts, Government guide and interpreter, who is a reliable authority on questions of this nature, says that there is another account of the origin of the name, and he is strongly inclined to give it the preference. This tribe lived for some time in the northern part of the country, where the mud was soft and of a dark colour, and at that time, and from that cause, their moccasins became dark, and consequently they received the name of Blackfeet, which now they bear. This name has also been applied to the Confederacy by some as a distinctive name.

Many years ago the Blackfeet, Crees, Sarcees and Gros Ventres were one people, and lived peaceably together in the Red River country. Together these tribes travelled westward and settled near a large lake surrounded by woods in the country of the Saskatchewan. The present Provisional District of Alberta was at that time peopled by the Flatheads, Shoshonees, Crows, and other Indian tribes. The first white men whom the Indians met were the traders, who came to barter goods for furs and hides. From these traders the members of the Blackfoot Confederacy received guns, and they drove the Flatheads and Shoshonees across the mountains and the Crow Indians into the region of the Yellowstone. The Blackfeet do not now know the exact location of the lake where they settled many years ago in the north. During the period when the Crees and Blackfeet were one people they were travelling southward when a quarrel arose about a dog. Dogs were very scarce at that time, and hence the quarrel became an important one, involving the tribes. So serious did the affray become, and the hostility manifested so very great, that the Crees and Blackfeet separated and have remained independent until the present day. A long period before the advent of any white settlers the Blackfeet travelled as far southward as Salt Lake, hunting wild horses and buffalo, and they went eastward for trading purposes to a trading post at Qu'Appelle, in the provisional district of Assiniboia.

The three tribes, Blackfeet, Blood and Piegan, which constitute the Blackfoot Confederacy, are three distinct tribes, having no common council, or bond of unity, except the ties of a common parentage, language, customs, traditions and interests. I have never learned that any common council consisting of delegates from each of the tribes has ever been held since they separated. Whenever any important matter was under consideration which affected the Confederacy, a young man,

commonly called "a runner," was sent to carry the news, or a chief would be delegated as messenger, but generally one of the servants of the head chief. If it were a grave matter, the head chief of the tribe would undertake the mission, and upon his arrival would be treated in an honourable manner, as became such an august personage. The head chief and the minor chiefs of the tribe would then assemble and the matter would be brought before them by their illustrious visitor and discussed.

The state life in each of the tribes is the same. There is not a definite number of gentes in each tribe. There is not a common taboo for the gentes. Some of the gentes have a taboo, but not all. There is not one common to all, each gens which has a taboo has a distinctive one. There is one, however, which partakes of the nature of a common taboo, which relates to the Naâye gens. This gens will partake of fish, but none other of the gentes will partake of them. Sometimes a single individual will eat a piece of flesh of some bird or animal, and upon learning what it is will spit it out, exclaiming, "That is against my medicine."

There is one common ancestor for all the Indian tribes. He is not an ancestor in the proper sense, but a secondary creator. He is called *Napioa, the Old Man*. He is not the creator of the gens, or tribe, but of the whole Indian race.

Individuals belonging to one gens can marry into any other gens. The wife goes with her husband to his gens and lives there with him. If he dies, the widow can remain in her husband's gens or return to her own.

The Blackfoot Confederacy have not any adoption ceremony. I have seen women belonging to the Cree and Kooteenay tribes, and men who in their youth were Ojibways and Crees, and these were treated as members of the Blackfoot Confederacy, no distinction being made between them. None of these had ever gone through any adoption ceremony. In the matter of caring for orphans, they are looked after by the nearest relatives, and when these fail they are provided for by the tribe. They are never allowed to be in want, for the people say as they are of the same flesh and blood they must be cared for by the people.

There are several state classes, the most important being the chiefs. They are called *Ninaks, fathers, chiefs*. Of these there are three kinds, namely, two principal chiefs, the peace or civil chief, and the war chief, and the minor chiefs. The two principal chiefs have each one gens, and are also the supreme heads of the tribe. Each minor chief has a

gens, whose interests he attends to at the meetings of the council. Each member of the gens is specially protected by the minor chief. When Crowfoot, the principal chief of the Blackfoot tribe, was alive, the people belonging to the three tribes spoke respectfully of him, and had there been a supreme head for the Confederacy there is no doubt but that he would have been elected to that position, but whenever he visited the Blood Indians he did not preside at the council, but was treated as an august member of the Confederacy. Questions of a federal nature were submitted to him, as to the supreme heads of the other tribes. The Indians are a people jealous of their rights, and no one, no matter how noble his character and great his position, would accept of honours or usurp authority.

The war chief is the head warrior of his tribe. In the ancient days the mode of election was conducted in the following manner: When a warrior had shown himself to be especially brave, giving evidence of great courage, good judgment and honesty, and had won the esteem and affection of his tribe, the camp-criers, who were invariably old men, went among the lodges visiting the people and extolling the virtues of their candidate. By this means all the people soon learned the name of the candidate and his claims for the position. This action of the criers was kept up until the sun dance ceremonies were in full operation, and then the warriors mentioned the name of the man desired for the position. They expressed their wish for the election of their candidate. The person designated for the position was then placed in the centre of the medicine lodge, and the people declared him elected as war chief of the tribe by assenting with their voices. A rival candidate was easily thrust aside through the influence of the camp-criers. The criers were skilful in all matters affecting an election, so that it was a settled question who was to be the war chief before the sun dance began.

The duties of the war chief were to make arrangements for war, and to lead the warriors to battle. Virtually, he was supreme in the camp during a period of war. War could not be resolved upon without the concurrence of the council. At this council the peace chief presided. Small parties might go out to make raids upon their enemies, for the purpose of stealing horses, but these were of such minor importance that nothing was thought of them. When, however, the war was of a tribal character the council must decide, and when the decision was favourable to war, the war chief had almost, if not altogether, the sole control of the camp. At a council meeting presided over, some years ago, by Red Crow, the peace chief of the Blood Indians, to consider the question of going to war against the Sioux Indians, who were supposed to be within the territory of the Blackfeet, and therefore guilty of trespassing, it was decided to go

to war. *Natosonesta, Medicine Calf*, one of the most influential chiefs of the tribe, was not present at the council, and it was at last agreed to adjourn, to meet and hear Medicine Calf's opinion. The council met, and the chief was present, when the decision of the council was stated to him. The chief listened intently, and then asked,

"Where are the Sioux?"

"In our territory," was the reply.

"What harm have they done?" he enquired.

"They have not done any," was the answer.

Curtly then he spoke to the council: "I fight against my enemies!"

This ended the council meeting and the Blood Indians did not go to war.

The war chief was in the early days elected for five years, but now they retain their position for life, or until they are unfit to perform their duties. Since the institution of reservations, and the supervision of the Government, the chiefs are retained in their positions during good behaviour, or until death or incompetency removes them. The present war chief of the Blood Indians is *Manĭstokos, the Father of Many Children, alias* White Calf.

The peace chief is elected similarly to the war chief. His duties are to keep order in the camp, and to regulate all matters in the camp. He is the chief civil officer, and is supreme except in times of war. When the tribe is on the march he gives orders where the lodges are to be pitched collectively. Whenever anything happens as they are travelling the soldiers call a meeting in the chief's lodge, over which the chief presides. The question is discussed, and a decision arrived at, whereupon the soldiers receive their instructions from the chief and hasten speedily to obey his command. All petty grievances and quarrels are brought before him, and he gives his advice as to the manner of settlement. Grave questions affecting the tribe, and not of an individual character, are reserved for the council; but all minor disputes arising from theft, offences against the person, and questions of a similar nature are settled by the chief as judge, magistrate, adviser and father to his people. The peace chief must be therefore stern in giving his decrees, wise and sympathetic in counsel, dignified in his dealings and impartial in his judgments—a judge on the bench and a father at the lodge-fires of his people. At the camp-fire he is stern and dignified, at the lodge-fire sympathetic and humble. *Mikasto, Red Crow*, is the peace chief of the Blood Indians.

Besides the minor chiefs, one of whom presides over each gens, and the sum of them constitute the council, there is a class of men known as soldiers, warrfors, braves or policemen. All the young men in the tribes aspire to the position. When a young man is anxious to become a warrior he presents himself to the war chief, who examines him, and if he finds him a suitable person he is admitted, if not, he is rejected. Sometimes a young man performs a brave deed which raises him so much in the esteem of the people that he is honoured. Without any application from him, when a brave act has been performed, he is admitted as a warrior. Promotion lies with the war chief, who raises his warriors to their respective grades, according to their ability and the display of their bravery. No man can be elevated who does not perform a warlike deed. The soldiers act as warriors in times of war, and during the periods of peace they are the policemen of the camps. They are therefore under the rule of the war chief in troublesome days, but in the peaceful days they are under the guidance of the peace chief. They keep order in the camp under his instructions. They are related to the chiefs as messengers. The writer remembers a detachment of black soldiers coming to Medicine Calf's lodge late one evening and taking away the wife of *Dog-Running-Back*. She had been married according to the native custom to an old man, but subsequently a young man named *Dog-Running-Back*, son of *Medicine-Calf*, had won her affections, and she escaped with him. It was an elopement, but these were of such frequent occurrence that the Indians spoke of them as "*stealing a wife*." The old man learned of the return to the camp of the guilty pair and he called in the aid of *Mikasto*, the peace chief, who sent the black warriors to arrest the woman. It was at midnight when they came to the lodge. They allowed her to ride upon her own horse behind them. As they rode through the bush she slipped off her horse, and under the cover of the darkness escaped. The matter was ultimately settled to the satisfaction of all parties concerned.

Jerry Potts told the writer that when he was war chief amongst the Piegans, *Running Wolf*, a Piegan chief, was guilty of a misdemeanor and was summarily treated, according to the laws of the tribe. The peace chief had given orders one evening, as they were on the march, that no one was to advance on the following day, nor at any time, without instructions. The war chief had under him fifty men, and as he was keeping guard he saw an object ahead of the camp, at a long distance. Jerry and his fifty men went out to ascertain what the object was, when they were surprised to see *Running Wolf* standing beside his horse, and upon the ground a dead buffalo. When asked the reason for disobeying orders he pleaded in extenuation that he only went out to get

this buffalo, as he had seen it; besides, this law did not apply to him, as he was a chief. The warriors looked at their leader, and at once he gave orders that the law must be obeyed by everyone, and anyone breaking the law must be punished. The warriors took *Running-Wolf*, stripped him naked, took away his horse, and made him walk to camp, a distance of seven miles. After some consultation in the camp his horse was given back to him, but they tore his blanket in shreds, and kept all the rest of his property.

There are several grades of warriors among the tribes. The writer found the following grades among the Blood Indians:—

Mokaikĭnûkĭ, the Brave Warriors: Heavy Shield is head of this band of soldiers.

Mastoqpatûpĭ, the Crow Warriors.

Imĭtaiĭnakĭ, the Dog Warriors.

Etsĭnakĭ, the Horn Warriors.

Kaispa, the Sioux Warriors.

Siksĭnaksĭ, the Black Warriors.

Potaina, better known as "Joe Healey," told me that the men must be thirty-four or thirty-five years of age before they are admitted into the ranks of the black soldiers. The highest position obtainable by a warrior is after having passed through all the military grades he receives the full rank of warrior.

The following gentes are found among the Blood Indians:—

1. *Siksĭnokaia, the Black Elk People.* This is the name of the gentes whose chiefs are Eagle Head and Blackfoot Old Woman. The legend says that a child was born very dark, when he became a man he wore an elk skin. He became a chief and his gens was named the Black Elk people.

2. *Inepoia.* This is the name of two gentes, Bull Back Fat's and White Calf's. There are two or three families in One Spot's gens who belong to the *Inepoia* gens. The legend says that a long time ago their ancestors walked a great distance and because of the journey and the heat they perspired freely, and then they were called *Inepoia, the Sweating People.*

3. *Otekûksĭn, the Short People.* This is another name for Bull Back Fat's gens.

4. *Apikaks, the People with the Sore Feet.* This is the name of the gens, of which Strangling Wolf is the chief.

5. *Mamyauye. Red Crow, Mikasto,* who is peace chief of the Blood Indians, is chief of the gens named above. This chief is also called Onistaiákapi. The gens has two names, and the legends state that there was a period when the tribe was absent hunting buffalo, and the members of this gens remained at the mountains, being unable on account of sickness to accompany the tribe. They had no buffalo meat, and they fished in the mountain streams, catching large quantities of fish, which they ate. They were therefore called *Mamyauye, the Fish Eaters.*

At another period in their history the brother of Red Crow was peace chief and also chief of this gens. During this time a friend gave unto him a revolver with six chambers, a rare thing for an Indian to possess at that time, and from this circumstance the gens was named *Naâye, Six Mouths,* from the six chambers of the revolver.

6. *Piksistaia, the Goose People.* This is the name of the gens of which Sakoïstamik is the chief.

7. *Netaitskaia, the Bad People, Enemies.* Two gentes bear this name, one governed by *Heavy Shield* and the other by *Eagle Rib, Petoqpekis.*

8 *Imûksenta, the Vexed People,* from *Maksento—he is cross, vexed, angry.* Low Horn is the chief, and the legend says that many winters ago the chief of this gens died, and the people being unable to go out hunting the buffalo, because of the mourning time and there being no one to lead them, they were vexed.

9. *Ipûkimûnoawa, the People with the Skinned Legs.* This is the name of the gens of which *Manistokos, Father of Many Children,* better known amongst the white people as White Calf, the war chief of the Bloods, is the chief. *Inepoia* is another name for this gens.

There are other legends connected with the gentes, but some of them are vulgar in their origin. Some of them seem to partake of the nature of nicknames. So far as I am able to judge, they must be accounted for in the same manner as the giving of names unto individuals. Generally each person has two names, a good one bestowed upon him for some brave action or worthy characteristic, and a bad one given because of contempt, for having been guilty of a foul deed, or it may arise from a mean disposition. Another class of names is given in a mood of playfulness to mark some humorous trait in the individual. The reason, then, why the Indians will never tell their names when asked arises from the fact that in pronouncing their names they are telling their characters. Modesty hinders the possessor from mentioning the honourable name and

shame from telling the comtemptuous one. The names of the gentes appear to be given in accordance with this custom of bestowing personal names.

Some of the aged men informed the writer that in the early history of the Confederacy some of the Indians were held in slavery, but they have held no slaves during the lifetime of any of the people now living. There are some old men, however, who act in the capacity of servants to some of the chiefs. I have never known any of these, although I have seen young men acting as messengers. Some of them seemed to hold an official position, for they were not related to the peace chief by marriage, although they belonged to the same gens. They undertook long journeys when ordered to do so, interpreted when they had the ability, and received no compensation for their work.

Since the making of the treaty the mode of forming a gens and of electing chiefs has been modified. An influential Indian may secure a large number of adherents through his boldness in proposing some popular measure, first by suggesting it, and by secret and incessant agitation keeping it before the minds of the people. His name will be brought forward at some interview with prominent Government officials after the way has been cleared by securing strong support from the people, a promise of investigation will be given, and the Indian council having nominated him, the Government will finally sanction his election, if that is in the interests of the tribe.

When the tribe is on the march there is a regular order of camping. This is a very simple arrangement, and there is not the elaborate and definite method of division which exists among the Dakotahs. When the people reach the place appointed for camping, the peace chief has his lodge pitched upon the westward side, he is surrounded by the leading members of his gens, and then eastward the chiefs have their lodges pitched at a sufficient distance from each other to allow the members of their respective gentes to surround them. The sacred tents are guarded by the soldiers. This latter arrangement has not taken place for several years, as I have never seen any of these sacred lodges, but I have been informed by the aged chiefs that such were in existence in the early years.

Several sacred pipes belonged to the Blood tribe, some of which are still in possession of the chiefs. The tribal pipe had a large stone head with figures of animals cut before and behind, the stem was about three feet long, made of wood, carved and painted, from which fringes of ermine skins were appended. A woman was detailed to look after it. In travelling, this woman carried it upon a horse, upon which nothing else

was allowed to be borne. After reaching the camp, it was taken into the lodge, being carried around on the right hand side of the lodge, never deposited in its place from the left hand side. Besides this pipe, of which there was one for each camp, there were sacred medicine pipes possessing great healing powers, of which we shall speak when we treat of the medical priesthood.

The Blood Indian Reservation is the largest Indian reserve in the Dominion. It is located between the Belly and St. Mary's rivers near Macleod, Provisional District of Alberta, the southern boundary of the reserve being about fourteen miles from the international boundary line. It is approximately sixty miles long by eighteen miles wide, and contains four hundred and seventeen thousand acres, or five hundred and forty-seven square miles. It was surveyed in August, 1883, in accordance with the amended treaty of July 2nd, 1883, by J. C. Nelson, Dominion Land Surveyor. The Indians have a timber limit in the Rocky Mountains, concerning which those interested will find full information in the "*Descriptions and Plans of Certain Indian Reserves in the Province of Manitoba and the North-West Territories, 1889.*"

In September, 1888, the Indian population on the reserve was two thousand one hundred and thirty-five. There was at that time one head chief and eighteen minor chiefs. There were twenty-one bands or gentes. So we have nineteen chiefs and twenty-one bands, but there were two bands without a chief. One of these contained nearly forty persons and the other nearly seventy, and a large majority of them were females. The number of children between six and sixteen years of age was about six hundred. The number of deaths during the year was as follows: forty-one boys, twenty-three girls, fifty-one adults. The adults' ages were chiefly from forty to forty-five years, but there were some of an extremely old age. The number of births was fifty-one boys and thirty-four girls. The amount of treaty money paid was ten thousand eight hundred and seventy-five dollars. The Indians are fed by the Government, and the daily ration averaged *per capita* 1.09 pounds of beef and .37 of a pound of flour. The number of acres broken on the reserve was two hundred and forty, and the number under fencing three hundred and thirty-five acres. The number of houses on the reserve was two hundred and sixteen. Several of the old houses had been rebuilt and improved by the Indians during the year, and fifty new ones had been erected. The Indians owned from fifteen hundred to two thousand horses and an innumerable company of dogs. During that year there were grown by the natives nine hundred and eighty-six bushels of potatoes from thirty-three acres. Owing to the dry rot the crop was not a good one. They

had ninety acres of oats, producing one thousand three hundred and fifty-six bushels; three acres of wheat with fifty-six bushels, and over twenty-five acres of garden produce, which did well. The number of employees on the reserve was the agent, farm instructor, clerk, interpreter, issuer and assistant issuer, cook, and three white men as labourers to teach the Indians farming. A medical man visited them regularly to attend to the sick. During the busy season of the year, say from March till November, four Indians were employed by the Government and received pay, all the rest of the Indians doing their own work.

In October, 1891, the writer paid a special visit to the reserve, and he found the Indians building better houses, growing larger crops, getting out hay contracts for the mounted police, and understanding more clearly their relations to the white settlers. At that time the average daily ration *per capita* was one and a quarter pounds of beef without shrinkage and .42 of a pound of flour. This would not be sufficient for supporting an adult, but when we note the fact that a child one day old receives the same, it can be easily seen that where there is a large family of children there will be sufficient. It is not the intention of the Government to feed them without doing something to support themselves, as that would beget and maintain a system of pauperization, but to keep them from being in want and at the same time encourage them to toil. The Indians receive their rations at the Lower Agency twice per week, and the same number of times at the Upper Agency. The reason for issuing at the two agencies is the distance of the bands from each other, the Indian camps being located for more than thirty miles along the Belly River.

It costs the Government about fifty dollars per head for supporting the Blood Indians. The Blood Indians consume over five thousand dollars' worth of beef per month. Five or six years ago they consumed over six thousand dollars' worth per month. The beef is furnished by contractors, who are paid eight and a half cents per pound. They must give the whole animal with the offal, but they are only paid by the weight of the four quarters, the head and offal being delivered, for which they receive not any compensation. All the hides which are not needed by the Indian Department for the use of the Indians are taken by the contractors at two dollars each. There are between seventy and eighty hides per month, of which the Indians use about thirty-five, the contractors paying two dollars each for the rest, the price being deducted from the amount paid for the beef.

From October, 1889, to October, 1890, there were born twenty-four boys and thirty-five girls, and there died twenty-two boys, thirty-one girls and fifty-five adults. The estimated population of the Blackfoot

Confederacy is about as follows:—Bloods, 1,700; Piegans, 600; Sarcees, 300; and Blackfeet, 1,100. The causes of the decrease are the same as are found amongst all native races, but this question will be fully discussed in a subsequent paper. Each Indian is paid annually the sum of five dollars for himself and the same amount for each member of his family. Each minor chief receives fifteen dollars and the head chief twenty-five dollars per annum, with the five dollars *per capita* for their families.

The following list of Indian names obtained by the writer at the Piegan reserve will reveal the method and meaning of Indian names. The names of some of the male members of the camp were Eagle Tail Feathers, No Runner, Chief White Cow, Dog Child, Crow Flag, Weasel Tail, Gives to the Sun, Elk Blood Head, Dog's Head, Sits in the Middle, Running Eagle, Man who Talks, Man who Lost his Blanket, Iron Breast, Black Weasel The Spider, Big Plume, Good Killer, Surrounded at Night. The names of some of the women were as follows:—Small Medicine Lodge, Weasel Woman, The Woman to Look at.

Strangers were always honourably treated, the best seat beside the chief being given, and the choicest pieces of the buffalo supplied. They were hospitable to the stranger when in the camp, and he was under the special protection of the chief. After he had gone, however, he was in danger at the hands of the young men, the renegades of the tribe, who felt free to deprive him of his property, when once he was beyond the jurisdiction of the chief.

A NEW READING OF THE BUDDHIST INSCRIPTIONS OF INDIA.

By John Campbell, LL.D.,

Corresponding Member Anjumani Punjab of Lahore, etc., Professor in the Presbyterian College, Montreal.

(Read 3rd December 1892.)

Those who have made a study to any extent of the early history of India cannot fail to have been struck with its shadowy indefiniteness down to the time of the Mohammedan conquest, in the eleventh century. The two native chronicles, the Raja Tarangini of Cashmere, and the Mahavansa of Ceylon, are little less doubtful authorities than the ancient epics, and the Puranas or mythological treatises. Abul Fazl, the other Mohammedan historian, and the Chinese Buddhist pilgrims add little that is trustworthy. When, therefore, it was known, through the labours of General Cunningham and his officers of the Archæological Survey, that ancient inscriptions abound in the sites of ruined cities and towns, great expectations were raised in the breasts of enquirers after historic truth, and a solution was looked for of those difficulties which compelled the translator of Lenormant's Ancient History of the East to omit the chapters on the history of the Indians. "To the book on the 'History of the Indians,' however, serious exception has been taken, not from any want of ability in M. Lenormant's treatment of the subject, but from a distrust of the reality of the foundation on which all the history of Ancient India rests."[1] It was confidently hoped that the reading of the inscribed monuments would remove the cause of this distrust, but such has not been the case.

The most important, because the most ancient, of these inscribed monuments are known, from their structure and from the emblems which accompany them, to be of Buddhist origin. The written characters engraved upon them have been, therefore, called Buddhist, and they constitute what is sometimes termed the Lat Alphabet, because many of the inscriptions in them are found on *lats* or pillars. This alphabet is square, as is the modern Hebrew, but has no connection with it, nor with any other alphabet, Semitic or Aryan. Nevertheless, it appears to have been the foundation of the Sanscrit or Devanagari characters, and

of other legible but aberrant types of later growth found throughout India and extending beyond its borders.[2] The phonetic powers of the Lat Alphabet remained a mystery down to 1838, when Mr. James Prinsep, secretary of the Asiatic Society of Bengal, announced his discovery in the journal of his society. After some discussion, it was generally agreed that Mr. Prinsep had found the key to the Buddhist inscriptions by identifying their characters as forms of the well known Devanagari.[3] Hundreds of inscriptions have been partially translated, some of them of considerable length. They are not Sanscrit, they are not Pali, though more like that than anything else; their language is a sort of *lingua franca*, intelligible only to their translators, and not always even to them. They are full of dates and donations and mendicant monks, and do not afford a single satisfactory fragment of ancient history. For all the gain they are to the historian they might as well have kept their worthless secrets.[4]

The translations of Mr. Prinsep, General Cunningham, Professor Dowson, and many learned Babus, proceed on the assumption that the writers of the documents were Brahmans, or at least an Aryan people. Philologists have conclusively shown that the substratum of Indian speech is Turanian, a substratum that exists, almost in its integrity, among the aboriginal or non-Aryan tribes of the empire.[5] Archæologists also have referred the most ancient buildings and monuments of India to these Turanians, who excelled their conquerors in the magnificence of their architecture.[6] There is no evidence that Brahmans ever became Buddhists, whose religion was a revolt against their own. Gotama Buddha himself was a Kshattriya, not a Brahman, and although many people of Kshattriya descent may be found among the Hindoos of to-day, this fact no more makes an Aryan of the original Kshattriya than incorporation in the west makes an Italian of the Etruscan, or an Englishman of the Pict. All over Europe, in Armenia, in Kurdistan, and in Persia, the Aryan incorporated the Turanian, annexing part of his speech and assuming the greater portion of his history and mythology as his own property, but nowhere was this process of amalgamation so complete as in India. The Brahman pantheon overflows with Turanian deities, the Indian epics are the records of Turanian warfare and adventure, the very post-positions of the Sanscrit language exhibit Turanian influence upon something more stable than mere vocabulary. That there was a genuine Turanian empire in India is proved by architectural remains, which are many of them easy to identify with Buddhist cult. Did the wealthy monarchs and powerful emperors who built these great edifices leave no written trace of their existence? Unless Mr. James Prinsep was mistaken, they did not. I prefer to believe that Mr.

James Prinsep was mistaken, and that his mendicant monks, etc., are the result of an utterly foundationless system of interpretation.

There was a time when the Turanian was regarded as a savage, having no part in the civilization of the world, which was supposed to have been accomplished altogether by peoples of Semitic and Aryan origin. True, the Egyptians and Phœnicians have always been credited with much of the world's early progress, but the language of the former was sub-Semitic, and that of the latter purely Semitic, whatever their original nationality may have been. No ancient Turanian writing was known. Nevertheless, there were such unmistakable evidences of early culture, distinct from that of Semites and Aryans, that anthropologists adopted various hypotheses to account for it, the chief of which was that known as the Cushite. These hypotheses led to nothing. But, after the cuneiform character had been mastered, it was found that at least one of the languages written in it, namely the Akkadian of ancient Babylonia, was not Semitic but Turanian, its affinities being with the Ugrian languages of Europe, still existing on the shores of the Baltic, along the Urals, and in Hungary. The Akkadian was a very ancient civilization, from which the Assyrians and later Babylonians borrowed largely. Of late years, the Hittites have come into prominence by their widely scattered monuments, and through the records of their numbers and their prowess contained in the Egyptian and Assyrian records. They also were a Turanian people. There was still another ancient people, closely allied politically, but neither ethnically nor philologically, with the Akkadians and the Hittites. These were the Sumerians, of whom we yet know very little, but who will yet appear, by indubitable testimony, as the eastern ancestors of the Celts. With them, however, we have at present nothing to do. Since Dr. Edkins, of Pekin, first drew attention to the subject, attempts have been made to connect the Akkadians of old with the Chinese of to-day by more than one writer; but none, save myself, has sought to trace in other lands, with the exception of Dr. Sayce, in Asia Minor, the powerful and widely spread Hittite nation.[7]

It may pertinently be asked why I select the Hittites rather than any other people of Turanian origin, in seeking the rise of ancient Turanian culture. The answer is, because there is no evidence of such culture having been developed by any other branch of that division of the human family, unless it were by the Akkadians, and these I firmly believe to have been under Hittite rule. Comparatively few families of the human race have achieved a historical position, the greater number constituting the Ground race, which possesses no independent history.

Certain families, endowed with peculiar virtues, physical and mental, rose to the position of kings of men, and lorded it over sections of the Ground race. Such kings of men among the Turanians were the Khita or Hittites, and under their power fell Semitic descendants of Aram, Lud, and Elam, and many Hamitic, and, perhaps, even Japhetic families. Thus, the historical Turanian peoples of antiquity, whatever the origin of their physical substratum, bore the Hittite name until their dispersion by the arms of the Assyrian Sargon in the end of the eighth century B.C., and some of them down to a much later date, as witness the Khitan of northern China in the tenth, eleventh and twelfth centuries A.D., and the Khitts of the Siberian Yenisci at the present day. In a former paper, I have shown that the people who built up a large wooden civilization in Siberia from the fifth century onward, and who left written monuments behind them, were branches of the Khitan, as their monuments denote, and, at the same time, the Japanese in migration. They migrated to Siberia from northern India, and their language is that fundamentally of the aboriginal or Turanian peoples of Hindostan. They were Buddhists, some of them fleeing from the persecution of their Pagan relatives or of the rising Brahman.[8]

The Siberian characters are not identical with those of the Lat alphabet, being much more rudely formed; but it is a matter of very little difficulty to exhibit the essential unity of the two systems of writing. In tracing the characters west of India, and between that country and the ancient Hittite habitats in Media, Mesopotamia, and Syria, they appear on Parthian coins down to and beyond the Christian era, but, so far as the time of migration is concerned, the labours of the excavator have not yet discovered the historical connection. A study of the original significance of the hieroglyphic Hittite characters enables the investigator to recognize, in the Parthian and Lat Indian, conventional or cursive forms of the same, and to read them without difficulty. When thus read, the inscriptions yield, like the Siberian, archaic Japanese. In this connection I may say that Dr. Jonathan Goble, who was a member of Commodore Perry's expedition to Japan, and who has studied Japanese for more than forty years, thus corroborates my Siberian readings: "As translated by you, I find these ancient legends almost pure classical Japanese, that I can make out without the least difficulty." As I do not claim the ability to write classical Japanese, it is evident that I must have found it already written. Such also is the language of the Buddhist inscriptions of northern India, whose writers, in several places, call themselves by the name Kita. Some translations of these I have presented in The Hittites, and a number of them, furnishing important data for India's lost history, will yet be found in the

Hittite Track in the East. I may add that a copy of an imperfect inscription in the Siberian character, found in Japan, has been lately sent to me.

The differences between Mr. Prinsep's method and results and those pursued and attained by me are: first, that while he has regarded the inscriptions as the work of an Aryan people, I have identified them with India's aboriginal population. He has, therefore, sought to find in their characters an Aryan alphabet, and has certainly succeeded in showing that the Sanscrit letters were derived from them. While not disputing his conclusion, I deny the inference that the writers of the Lat and those of the Devanagari attached the same phonetic values to the related characters. This inference in Asia Minor, in Etruria, in Celt-Iberic Spain, and elsewhere, has hitherto closed the gateway of knowledge and concealed the existence of ancient Turanian letters and history. Secondly, while the translations of Mr. Prinsep, and his scholarly coadjutors and successors, are made, often very inconsistently, out of a bastard Pali, otherwise unknown, those I present are made consistently throughout in classical Japanese, such as scholars can read without difficulty. Mr. Prinsep and his followers, thirdly, leave many parts of inscriptions untranslated, while I maintain, and prove in practice, that a whole document only partially translated is not translated at all. Fourthly, inscriptions, as read by Mr. Prinsep's alphabet, present unhistorical bathos. As read by mine, they are found to be royal documents of great historical importance. In fine, I stand towards Mr. Prinsep's system in the same attitude as I stood, and now still more firmly stand, towards those who read the Etruscan characters with their Greek equivalents. The so-called Lat alphabet is, like the Etruscan and Siberian systems of writing, a Turanian or Hittite syllabary.[9]

The fish like character denoting an m syllable, the rounded yoke or bow one giving a power of r, and that shaped like a square Hebrew *shin*, which has the phonetic value *go*, alone serve to link the Lat syllabary with the ancient Hittite, on the one hand, and, on the other, with the so-called runes of Siberia. Where and when did the cursive Turanian writing originate? It is natural to think that it followed the Hittite hieroglyphic; but, so far, we possess no Hittite hieroglyphic documents that approach by many centuries the most ancient inscriptions in the cursive syllabary. In the Sinaitic Peninsula, and dating back to the time of the patriarch Abraham, are Hittite documents of enormous value to the historian, and these are all in the cursive character.[10] Hittite hieroglyphics must thus have been much earlier, since there can hardly be any doubt that the conventional cursive was the

simplification for ordinary use of the original cumbrous hieroglyphic in Hittite as in Egyptian. The proof of the antiquity of the Sinaitic inscriptions will appear shortly in "The Hittites in Sinai," in which I have translated over a hundred of these venerable documents, records of the kings who reigned in Edom, of the princes of the Hittite confederacy, and of the shepherd kings of Egypt and their viceroys. It is probable that all alphabets and syllabaries may yet be traced back to one original, doubtless hieroglyphic in character, when it will be found that the variation to be considered most is not the form of the symbols but the varying phonetic values which diverse peoples attributed to the same form. As I have elsewhere stated, the names Aleph, an ox; Beth, a house; Gimel, a camel, and Daleth, a door; given by Semitic peoples to the first few letters of their alphabet, are proof positive of a hieroglyphic origin, and that a Turanian people would make such characters stand for the first syllable of ox, house, camel, and door in their own language. In the accompanying plates I present the equivalents of the Buddhist or Lat Indian syllabary, both as set forth in the Asoka proclamations and in ordinary royal inscriptions, and the texts I have chosen for illustration. My object is to aid scholars in interpreting these ancient monuments, and thus to place the early history of India on a firm foundation. The variations of characters in the Asoka proclamations are really a species of vowel notation, as yet imperfectly understood. Those in the ordinary syllabary are partly of the same nature, and partly due to changes in style arising from difference of time and place. As the most ancient inscription read is of 337 B.C., and others are later than the Christian era, it is natural to find varieties of style in writing. The characters represented in the plates are gathered from thirty-seven inscriptions, and are sufficient to enable the student to decipher any ordinary Buddhist Indian document presented to him.

The first text I present is that of the proclamation of Asoka, the Buddhist Constantine, found at Girnar. This I read, not as the interpreters of such inscriptions have so far done from left to right, but from right to left. The transliteration gives:—

I.

1. *shi · keki · shimane kiwame · ta ga*
2. *tashita · rikidowa ka ashika nega ki*
3. *girifu no aka hoi ochi · manete*
4. *janage ta fumi kareta nomija hitoshi*
5. *nai · kanegaki kaki · shimane rakajimu nomija*

6. *shimane · rametaki nomija tada · waraki-kuyashi*
7. *yajashi kimi oju ko asoka nega kiki kaki*
8. *mi · kami nise ochi ko asoka nega oja kaki · shimane*
9. *ka amakeja jahoi ochisa kage jarija sageshi ja*
10. *kimi ta ari o aba wa ketsu me-ta · goyoshi no · gune ochi ja*
11. *kija · ro medota amanji amake jai hoi ochisa*
12. *o · ja hoi ochishi maji · saki riyoki ri tama tashiremi*

II.

1. *go yasoki nega kija · kaki-shimane mori nomi arima ja*
2. *mi · riyoshi araja wareta riki ga araja · nakena tomi gijo ri · doji kimi mito*
3. *jame araja takara · ochi ja-rikima ga norashi go tokara-ochisha-ki*
4. *arata · mita adan go yasoka nega kija kaki · shimane arimaja sonaye*
5. *tosha arakiku sumeshaka · tosha fujune tomata tokiji tomata tokashime*
6. *tosha arakiki o tosha araki akerami jagasha rakuraku · tosha aritaka ji*
7. *tosha arakiki o tosha araki · akerami · jagasha-rakuraku-tosha wabi tosha wa amu*
8. *shiki sumijaji ga aruha · yajira kiki yado mamori kisha buda kido jomaye · ji* [11]

The following is the translation of this inscription, as closely rendered as English construction will permit :—

I.

1. Do, I pray, what the amnesty defines.
2. Hear the desire of the accomplished warrior, the excellent Asoka.
3. Cease to imitate the evil customs of the unrighteous.
4. Take individually the confession which the writing has given.
5. Do not deliberate, I pray ; receive pardon beforehand.
6. Accept universal pardon gratis, repenting wickedness.
7. Obeying the amiable lord, hear, I pray, the desire of the excellent Asoka.

8. Behold, leaving false gods, obey, I pray, the desire of the excellent Asoka.
9. For pardon leave pleasant evil rites, despise secret sports.
10. He who deserts the army of the violent will obtain protection from him who is lord.
11. Hear, quit the pleasant evil rites delighting in beguiling lust.
12. O do ye forsake evil rites, Tsurami, sovereign of the kingdom of the Sakis.

II.

1. Hear, I pray, the desire of the excellent Asoka: do ye accept the amnesty.
2. Behold, violence, the violence of strength, has divided the kingdoms. Within, law and justice cease: alike are lord and king.
3. Leave the assembly of assailing violence; leave the assembly of the measurers of strength. Hearken!
4. Hear, I pray, the desire of the new king named the excellent Asoka. Pardon is offered you.
5. Ended are the violent years; the evil years have ended now, have ended forever.
6. The violent years, O the violent years, blushing, I despise. Shall there not be years of pleasantness?
7. The violent years, O the violent years, blushing, I despise. Let years of pleasantness, a circle of peaceful years, remain.
8. As the master of the dwelling, hearing the housebreaker, guards the abode, so lock the door of Buddha.

Under the name Tsurami, Asoka appears in an inscription on a stone found in a mound at Mathura. Unfortunately this inscription and others of Tsurami are much defaced. It is No. 1 on Plate IV. The defacement is in the lower line, but the words, *Gotama shone wo*, can be made out, and, as elsewhere, the expression *Gotama shone wo ireru*, to give close attention to Gotama, or, as we would say, to give the heart to Gotama, appears as a Buddhist formula, it may be taken for granted that such is the meaning of the partially erased sentence. The upper line is quite distinct, and, from right to left, reads as follows:

No. 1. *Katame gosari mashi tsushigo tsugo butsu kisafuki Tsutemama Watatami Mareware Bushiyama go mito Tsurami futa ki 2 fu Buda go*[12]

The translation is: "I have a vow, Tsurami, surpassing all the warriors

of the earth, king of the Tsutemama, the Wata people, Marwar, and Fushiyama; 2 hundred 2 score after Buddha."

The next, No. 2, Plate IV., accompanies a naked standing figure. General Cunningham says: "The first part of this inscription is the only important part of it, the rest being a mere string of names of the donors." Having suggested emendations, he continues: "Adopting these alterations, the opening may be rendered as follows: 'Glory to the Arhat Maharira, the destroyer of the Devas!' (In the reign) of the King Vasu Deva, in the Samvat year 98, in Varsha (the rainy season) the fourth month, the eleventh day. On that very date, etc."[13] Now one ought to be able to do a great deal better than that. The upper line of the main inscription is complete, and the sense of that immediately below it, in which two characters only are wanting, can be accurately determined. The lower lines are very much broken, so that the left half only of the first of these affords material for decipherment. The subordinate square inscription on the right can be made out, but seems to lack a concluding word. The latter may be called the fourth part of the inscription, the other legible lines being 1, 2, 3, from top to bottom. The reading is, as usual, from right to left.

No. 2. Line 1. *Kumiwa mabu Buda hiromeku Tsumaki tama anoho atsufushi magetsu hime wo mire fui ochi tashi bun tsuku*

Line 2. *Sibir mafu ketaru toriwima Watatami Doidota Sibir ga wabi Kitsuuchi ga mito*

Line 3. *Gorami ga yome tsutaru betsu sai Amrita tsuta hime tatsuri*

Line 4. *Tsurami 1 meku maki 4 samura kami Kitsuuchi tsu tsudotatsu wo yobidata nedo ga kifuta.*[14]

The translation is: "The associated monks, proclaiming Buddha, affix the edict, allowing to be seen this great effigy (resembling monument) of the descendant of Tsumaki. Diodotus of the Wata people, king of Sibir and the peaceful Kitsuuchi, tarries to talk over (the affairs of) Sibir. Amrita, the principal wife of (his) successor, joins the widow of Gorami in setting up the monument. Tsurami summoned an assembly of 1,004 nobles of the Kitsuuchi (to inaugurate) the gift of the wife."

As unsatisfactory is General Cunningham's rendering of No. 3, which is on the pedestal of a life size naked figure. He reads: "(In the reign) of Maharaja Vasu Deva, in the Samvat year 83, in Grishma (the hot season) the 2nd month, the 16th day. On that very day the gift of an

image. 'The rest cannot be made out satisfactorily.'"[15] It is true that parts of the document are defaced, nevertheless I read:

No. 3. *Tsushiku ga mito Tsurami 2 maki 2 fu 3 Buda go Tsumaki tama tumi tsuku*

*Amrita ga koga sai Gorami mesume tsuta dzubotsu * ma * mu go bu ma tsuraka aritama*[16]

Translated, it says: "Tsurami, king of the world, 243 after Buddha, affixes the usual writing of the descendant of Tsumaki. His servant . . . joins Amrita, his consort, the daughter of Gorami, in renewing the likeness. . . ."

A brief inscription on the base of a pillar, from Mathura like the preceding, contains the name of the ancestral Tsumaki.

No. 4. *Tsumaki mito Tsutaka Saka ga mito tsuyoshi yaku maki 3 fu Buda hirometu* [17]

The translation is: "King Tsumaki, the mighty king of the Tsutaka Saka, 160 Buddha proclaims."

But General Cunningham's version is: "In the Samvat year 47, in Grishma (the hot season), the 3rd month, the 5th day. On that date the gift of the mendicant Dharma Deva."[18]

The oldest inscription I have yet translated is:

No. 5. *1 maki 4 ma Buda go Kafutake tori Kita;*

which, being translated, is: "140 after Buddha, the Kita choose Kafutake."[19]

Professor Dowson reads it: "Presented pillar 126 in the Samvat year 47, in Varsha (the rainy season), the 4th month, the 11th day."[20]

Finally, the following document appears inscribed in a circle surrounding the base of a pillar taken from the Jail Mound at Mathura, whence also came the inscriptions of Tsumaki and Kafutake. It is the clearest and most perfect of all the inscriptions read. It commences at the left hand side, at the break or open space near the bottom, and proceeds upwards and so round the pillar.

No. 6. *Bikrama goku agameke Matori fu arukumeku yobutata yodatsute ashikaze katsu daman Tsutaka Saki Afumi tsutome tatsure tami ki tsuneha renha, tsuneha fumi 4 ki 4 fu Buda go*[21]

Translation: "Vicram, the valiant, ruling the exalted city Mathura, summoned serviceable foot-soldiers to exterminate the Tsutaka Saki.

The mind of the people to serve Afumi sets up the usual orderly customary writing 480 after Buddha."

This, Professor Dowson interprets: "In the Samvat year 47, in Grishma (the hot season), the 4th month, the 4th day. Gift to the Vihara of the great king, the king of kings, the son of heaven, *Huvishka* by the mendicant Jivaka Udeyana. May it be to the benefit, welfare, and happiness of all in the four quarters (of the world)." [22]

In commenting briefly upon the preceding inscriptions, which will be discussed at length in my Eastern Track of the Hittites, the first thing to consider is the matter of date. The era is that of the death of Buddha, for which many dates are given, varying from 543 to 477 B. C. Vikramaditya is said to have fixed the Samvat era in 56 B. C., and with this statement the last inscription, which puts an event in his reign 480 years after Buddha, or 63 years B. C., according to the long computation of that reformer's death, agrees. But No. 3 places Tsurami or Asoka in 243 after Buddha, and No. 2 makes Diodotus of Bactria his contemporary. Now, the eldest Diodotus began to reign about 255 B.C., and the younger in 237 B.C. If 543 be the date of Buddha's death, Tsurami's date and that of Diodotus is 300 B.C.; but, if 477 be the true figures, the interview between Tsurami and Diodotus was in 234 B.C., which better satisfies chronology. The Buddhist convention under Asoka is said to have been held about 250 B.C., so that the date 543 is completely ruled out of court. The oldest date found, that of Kafutake, is 337, that of Tsumaki is 317, and that of Vicramaditya, 3 A.D.

Kafutake is the Gopaditya of the Raja Tarangini, which presents its array of Turanian monarchs in a Sanscrit dress, and he is the Sopeithes of Strabo, or, as Curtius calls him, Sopithis.[23] Strabo calls him a monarch of the Cathaei, and says that he opened his city gates to Alexander of Macedon and entertained him royally. This was in 326 B.C., or eleven years later than the inscription. Kafutake must have been an old man before he died, for another inscription of his states that, in 180 after Buddha, he superseded the Nandas by the Sakas. He may thus be also identified with Chandra Gupta, who overthrew the Nandas. Tsumaki, therefore, whose date is 317, must have been his contemporary during part of his long reign, and may be identified with the Sisunaga who helped Chandra Gupta in his revolution, and with the Sangaeus, whom, according to Arrian, Alexander set over Peucolaitis.[24] Both Kafutake and Tsumaki belonged to the Sakas or Sacae, but the former was also elevated to the throne of the Kita, who are the Cathaei of ancient writers on India. The Indian name for Tsurami is Dharma, often conjoined with his religious title Asoka, which is just the Japanese

yasuki, the peaceful, in the form Dharmasoka. He seems to have been recognized by all the Hittite rulers of northern India, and even of countries to the west of it, as an emperor or king of kings. One of his inscriptions enumerates the Tsutemame or Sushmins, the Wata, Futa, or Bakhdi, that is the Bactrians, the people of Marwar, and the Fushiyama, or ancient Kambojas to the north-west of Cashmere, as his subjects. The Bactrians, however, were under the sway of Diodotus, as were the Sibir or people of Cabul, so that Diodotus must have been tributary to Asoka.

Several inscriptions of great interest illustrate the intervals between Tsurami and Kafutaki on the one hand, and between him and Vicramaditya on the other. These are set forth with ample comment in the Hittite Track in the East. Vicramaditya, who on his inscription calls himself simply Bicram, sets himself forth as a Tsutaruki or Gupta king, by making Afumi, the Abhimanya of the Raja Tarangini, his heir to the throne.[25] The overthrow of the Sakas by this monarch is one of the best attested facts in ancient Indian history. If, as seems most probable, the date of Buddha's attainment of *nirvana* was 477 B.C., this event must be placed at or near the year 3 A.D. If he re-established Brahmanism, or rather the heathen worship of his own race, which contributed to modern Brahmanism its chief elements, as is very probable, seeing that several of his predecessors apostatized, his change of faith did not affect his successor Afumi, who appears to have remained a Buddhist. The kings of the Sakas belonged to the Varma dynasty, and, on another inscription mentioning Vicram and Afumi, are also called Kitan. No inscription so far read by me makes any mention of a Brahman. When idolatry is referred to, it is called the worship of the old gods, in other words, the Sintoism of Japan. There is not the least evidence for an ancient Brahman kingdom in India, but it will be very hard to convince a Hindoo that none such existed. However, the missing materials for the ancient history of India are now in the world's possession, and a little labour on the part of epigraphers, who are also Japanese scholars, will soon bring a flood of light to bear upon one of the most interesting but, until now, most obscure chapters of the history of the past.

NOTES.

[1] Lenormant and Chevalier, Manual of the Ancient History of the East, Vol. II., preface.

[2] Max Müller, a Sanskrit Grammar for Beginners, p. 1.

[3] Journal, Asiatic Soc'y of Bengal, March, 1838, pp. 219 seq.

[4] Reports of the Archæological Survey of India.

[5] Hunter's History of India, p. 23.

[6] Ibid.

[7] Edkin's China's Place in Philology: Rev. C. J. Ball and others in the Proceedings Soc'y Bib. Archæol., and in the Babylonian and Oriental Record: Campbell, The Hittites, etc.

[8] Siberian Inscriptions, Trans. Canad. Inst., 1890-91, Vol. II., pp. 261 seq. See also The Hittites, Vol. II., p. 325.

[9] See my Etruria Capta, Proceedings Canad. Inst., 1885-86, pp. 144 seq.

[10] Over a hundred of these I have translated in The Hittites in Sinai, yet to appear.

[11] Analysis of the Asoka proclamation:

Part I., line 1. *Shi*, now *se*, imperative of the verb *shi*, *su-ru*, to do.
kaki, now *kashi*, a word used at the end of a sentence of exhortation, entreaty, or request, to give emphasis to it. May be Englished by, I pray you.
shimane, now *shamen*, pardon, subject of *kiwame*.
kiwame, part of verb *kimawe-ru*, to define, determine, decide.
ta, the relative, who, which, generally followed as here by its genitive particle *ga*.

line 2. *tashita*, now *tasshita*, preterite of *tasshi*, to be thoroughly versed, expert, or proficient in.
rikidowa, now *riki-idomi*, strong contender, warrior.
go, a term of respect or politeness used in addressing a superior, meaning honourable, excellent.
Yasoka or *Asoka*, the religious name of the monarch.
nega, now *negai*, desire, request, prayer.
ki, part of the verb *kiku*, to hear. The imperative *ja* probably followed *ki*, but, if so, it has been erased from the inscription.

line 3. *giri*, right, just.
fu, a negative particle.
no, genitive post-position.
aku, bad, wicked, qualifying *hoi*.
hoi, now *hō*, rule, law, precept.
ochi, to fall, leave, run away.
maneta, preterite of *mane*, *maue-ru*, to imitate, do like.

line 4. *janage*, now *sange*, confession, acknowledgment.
ta, the relative.
fumi, a writing, book, letter.
kareta, now *kureta*, pret. of *kure*, to give.
nomi ja, now *nome yo*, imperative of *nomu*, to drink, swallow.
hitoshi, now *hitoshii*, same, equal, alike, literally one man.

line 5. *nai*, not, is not, have not.
kanegaki, now *kangaye-ru*, to think on, reflect, consider.
kaki, or *kashi*, and *shimane*, *shamen*; see line 1.
rakajimu, now *arakajime*, beforehand.
nomi ja or *nome yo*; see line 4.

line 6. *rametaki*, mostly, now *aramattaki*, a combination of *ara* as in *aramashi*, generally, and *mattai*, *mattaki*, whole, complete, entire.

line 6. *tada*, adverb signifying, only, merely, but with verbs of giving and receiving, hence gratuitously.

waruki, adjective *warui*, *waruki*, bad, but here used as a noun, wickedness.
kuyashi for *kuyami*, to repent, whence *kuyashii*, producing repentance.

line 7. *yajashi*, now *yasashii*, amiable: same root as Asoka.
kami, superior, ruler, lord.
oji, *ojiru*, to fear, dread, or *ōji*, *ōjiru*, to obey, comply.
kiki, to hear; see line 2.

line 8. *mi*, imperative or interjectional form of *miru*, to see, behold.
nise, false, counterfeit, as in *nise-gane*, counterfeit money.
ochi, to leave; see line 2.

line 9. *ga*, genitive post-position governing *shamen* of preceding line: here to be Englished by *for*.

amaki, adjective *amai*, *amaki*, sweet, pleasant, also foolish.
jahoi now *jahō*, wicked religious rites.
kage, shadow, and, metaphorically, secret, unseen.
jarija, noun, from *jare*, to play, frolic, sport, *jarashi*, make to play.
sageshi ja, imperat. of *sageshime*, to look down on, despise.

line 10. *to ari*, now *tari*, from *ta*, who, and *ari*, is, who is.
yo and *yu* are ancient poetical forms of the preposition *yori* from.
aba, now *abai*, to shield from danger, protect, defend, but here a noun.
wa or *wo*, the untranslated sign of the accusative case, here governed by *katsu me*.
katsu, to gain, conquer. The following *me* is a future particle (Aston's Grammar, p. 168).
ta, the relative.
goyoshi, now *tsuyoshi*, strong, powerful.
no, genitive particle.
gune, now *gun*, army.

line 11. *ki ja*, imperat. of *kiku* to hear.
ro, now *iro*, love, lewdness, lust.
medota, now *madotta*, pret. of *madoi*, to err, be deluded, misled.
amanji, to relish, delight in.

line 12. *mashi*, an old form for "you" (Aston's Grammar, p. 63).
riyoki ri, better *riyo giri*, rightful kingdom.
tama, master, qualified by the adjective *giri*, and, with it, governing *giri* in the genitive of position.

Part II., line 1. *mori nomi*, compound verb, consisting of *morai*, receive, accept, and *nomi*, drink, swallow.

arima ja is not *arimasu*, the honorific form of *ari*, to be, to have, but *ari* with an abbreviated form of *mashi*, *imashi*, the old 2nd personal pronoun, and the imperative sign *ja*.

line 2. *riyoshi* or *riyochi*, estate, kingdom.
araja or *arasa*, violence, harshness.
wareta, now *waritta*, pret. of *wari*, to divide, part, rend asunder.
riki, strength; *ga*, genitive post-position.
nakena now *naka ni*, within, composed of *naka*, middle, among, and *ni* post-position, in, into.
tome, part of verb *tome*, *tomeru*, to stop; *tomari*, to cease.

line 2. *gijo*, law, statute, ordinance.
ri, right, just, proper.
doji, composed of; *do*, same, and *ji*, way; hence, "alike," synonym of *onaji*.
kimi, if properly transliterated, is same as *kami*, lord, master.
mito, king, same as *mikado*, door being *to* or *kado*.

line 3. *jame araja*, now *seme arasa*, from *seme*, *semeru*, to assault, attack, harass, and *arasa*.
takara, noun derived from *takari*, to assemble, collect in a crowd.
rikima, now *rikimi*, a lengthened form of *riki*, strength.
norashi, now *norishi*, literally a maker of measurement.
ochi sha, same as *ochi ja*, leave (imperative).

line 4. *arata*, new; the present word for new is *arata-na*, but *arata* forms *arata-me*, to renovate, reform.
adan, now *ada-na*, nickname.
arimaja seems the same as *arimashi*, is to you, without dative sign.
sonaye, *sonayeru*, to set before, offer.

line 5. *tosha*, should be *toshi*, year, probably an error in transcription.
arakiku, lengthened form of *araki*, violent, rude, wild.
sumeshaka should be *sumashika*, from *sumashi*, to finish, end; in the past tense marked by *shika*.
fujune or *fujun*, bad, contrary, unfavourable, adverse.
tomata, now *tometa*, pret. of *tome*; see line 2.
tokiji, from *toki*, time, now abbreviated to *toji*, now.
tokashime or *tokishime*, compounded of *toki*, time, and *shime*, sum, total.

line 6. *akerami* or *akarami*, to become red, to blush.
jagasha, same as *sagesha* of Part I., line 9, to despise.
rakuraku, easy, pleasant, free from pain.
aritaka ji, *aritaki ji*, from *aritai*, *aritaki*, wish to be, let there be, and *ji*, negative future particle (Aston's Grammar, p. 157). The whole will thus read: shall there not be?

line 7. *wabi*, the old word for peace, which is now *wa*, while *wabi* means apology, supplication.
wa, a circle, cycle.
amu, supposed old form of *amashi*, to let remain, leave over.

line 8. *shiki*, now *shika*, so, thus, as.
sumijaji, compound noun, the parts of which seem to be *sumai*, a residence, and *jusho*, having the same meaning.
aruha, now *aruji*, lord, master, landlord, owner.
yajiri, abbreviated form of *yajiri-kiri*, a thief, house-breaker.
yado, house and grounds, home.
mamori, to guard.
kisha by a strange inversion is *kaku*, thus, which, as I pray, the Girnar Japanese makes *kaki*, and the modern, *kashi*.
Buda, the usual form of Budha's name in the inscriptions; in modern Japanese, *Butsu*.
kido should be *kado*, door or gate.
jomaye ji, *jomaye*, a lock; the following *ji* is equivalent to *shi*, do.

[13] Analysis of No. I.

katame, promise, agreement, pledge, vow.
gonari masu, I have, there is (Aston's Grammar, 174).
tsuskigo, from *tsuchi*, earth, and *gu*, genitive particle.
tsugo, all.
butsu, to strike, *bushi*, a soldier.
kisafuki, from *kisoi*, to excel. Most Jap. verbs now ending in *oi* and *ai* are abbreviations of older forms in *ofu* and *afu*: the final *ki* is the attributive termination.
go, following names of places, is the genitive *gu*.
mito or *mido*, now *mikado*, honourable door, king—emperor.
futa or *buta*, now *futatsu*, 2: the *tsu* is generally omitted.
ki, sometimes *maki*, Japanese *momoki*, hundred. The short form is the Yeniseian *ki*, *kihe*, *kise*.
2 *fu*: the numeral 2 is expressed by the two lines = , and the following *fu* is an abbreviation of the old word for 20, now *hatachi*, which was probably *futachi*.
Buda go; the latter word is a post-position, after, behind.

[14] Archæological Survey of India, Vol. III., Pl. XV., No. 20, and p. 35.

[15] Analysis of No. II.

line 1. *kumi-wa*, now *kumi-au*, joined together in one company, qualifying *mabuso* which is not modern Japanese. A nun is *ama*, and *ambu* is quiet, peaceful, happy. The word occurs in several inscriptions in India and Siberia, and denotes a monk.
hiromeku, adjective or participial form of *hirome*, to spread, publish, proclaim, governing Budha.
tama, abbreviation of *ato-me*, successor.
anoho, compound of *ano*, that, and *ho*, place, meaning, that there.
atsufushi, form of *atsui*, thick large, great, liberal. Final *i* after a vowel generally stands for an ancient *fu*.
magetsu, adjective form of *magai*, imitation, *magaye-ru*, to imitate.
hime, now simply *hi*, a monument: *me*, a common suffix, as in *ato-me*, successor, *kake-me*, weight.
wo, particle specifying the direct object of the sentence, *hime-mire*, to see.
fui ochi; *fui* seems to be the old form of *ho* in *ho-dai*, at liberty, and to have the same meaning: *ochi*, like the Basque *utzi*, means to leave,
tashi-bun; *tasshi-gaki* is a government proclamation, and *bun* or *fumi*, which takes the place of *kaki* or *gaki*, has the same meaning, writing.
tsuku, now *tsukeru*, to affix; *tsuku* is the neuter form.

line 2. *Sibir*, a country, perhaps Cabul.
mafu ketaru, now *katarai*, converse together; *mafu*, a humble word for *ifu*, to say, denoting the subordinate position of Diodotus.
tori-wima, inversion of *hima* or *fima-dori*, to delay, literally, take leisure.
Wata-tami, the Bakhdi or Bactrian *tami*, people.
Doidota, the Sanscrit Devadatta and Greek Diodotus.
ga, the genitive post-position.
wabi, peaceful; see Asoka inscription.
Kitsuuchi, a north-western people, the Khasas.
mito, king, now *mikado*.

line 3. *Gorami*, a king, whose inscriptions show him to have been contemporary with part of the reign of Tsurami or Asoka. He ruled Mekasa, perhaps Massaga of the Assaceni.

yame, now *yamome*, widow or widower, difficult at times to distinguish from the Indo-Hittite *yome*, daughter.

tsutaru, now connected with *tsutawaru*, to inherit, meaning the heir or successor.

betsu, separation, distinction, here answering to *betsu-jo*, special.

sai, wife.

Amrita, a woman's name: Raja Tarangini, L. III., sl. 9, 463, L. IV., sl. 658.

tsuta, for *tsuida*, preterite of *tsugi*, to join.

kime; see line 1.

tatsuri, now *tateru*, but regular transitive form of *tatsu*, to stand.

Part IV. *Tsurami*; see Asoka inscription.

meku maki: *me* is Indo-Hittite 10, and *maki* 100.

sumara, now *samurai*, a gentleman, one privileged to wear two swords.

kami, lord, ruler.

tsu, old genitive particle.

tsudotatsu seems to be a compound of *tsudoi*, to assemble, and *tatsu*, to stand up. As *tachi*, *tatsu* is in Indo-Hittite often used transitively; it may here be the verb governing *kifuta* that in the text is supposed to be lost. In this case the passage will read: "Of 1004 nobles of the Kitsuuchi Tsurami summoned an assembly—to set up—the gift of the wife."

wo, the mark of the accusative, often omitted.

yobidata, preterite of *yobi-dasu*, to call out, summon.

nedo, Indo-Hittite and Siberian vulgar term for wife, from *ne*, *neru*, to sleep, and *do*, together, similar in form to concubine.

kifuta, now *kifu*, a contribution or donation.

[15] Archæological Survey of India, Vol. III., Pl. XV., No. 16, and p. 34.

[16] Analysis of No. III.

line 1. *tsushiku*, now *tsuchi*, earth, the earth.

ga, genitive particle; *mito*, king.

2 maki 2 fu 3; *maki* 100, *fu* 20.

Buda go, after Budha.

tama, is not *tama*, master, but modern *ato-me*, descendant.

tsuncho, from *tsune*, usual, and *ho*, place, this usual.

fumi, writing.

tsuku, affixes; see above, No. II., line 1.

line 2. *koga*, from *ko*, this, and *ga*, genitive, the demonstrative employed for the possessive adjective of the third person.

sai, wife.

mesume, now *musume*, daughter. This reading is doubtful, as it is the only place in which I have found *mesume*.

tsuta, joined; see No. II., line 3.

dzubotsu, now *sobadzukai*, attendant. Compare *dzusa*, follower, servant, and *dzui-shin*, follower, disciple.

* *ma* * *mu go bu ma*—illegible.

tsuraka, likeness, from *tsura*, the face.

aritama, now *aratame-ru*, renovate.

[17] Analysis of No. IV.

Tsumaki, a king's name.
Tsutaka Saka, a branch of the Sacae.
tsuyoshi, strong, mighty.
yaku, old numeral 1.
hirometu; see No. II., line 1.

[18] Archæological Survey of India, Vol. III., Pl. XIV., No. 11, and p. 33.

[19] Analysis of No. 5.

ma, old form for 10 abbreviated.
tori, take, seize, obtain, admit, select.

[20] Archæological Survey of India, Vol. III., Pl. XIV,, No. 14, and p. 34.

[21] Analysis of No. VI.

goku, sometimes, as now, *goki*, stout-hearted, brave.
aɋameke, adjective, from *agame-ru*, to exalt, honour.
fu, a chief city.
yobutata, pret. of *yobi-dashi*, call out, summon.
yodatsuta, adj., from *yodatsu*, to be of use.
ashikaze, now *ashiɋaru*, foot soldiers.
katsu, to conquer.
daman, now *dam-metsu*, to exterminate.
tsutome tatsure, to serve, to set up.
tami ki, people's mind.

[22] Archæological Survey of India, Vol. III., Pl. XIV., No. 12, and page 33.

[23] Raja Tarangini, L. I., sl. 341; Strabo, XV., l. 30, 31; Curtius IX., 5.

[24] Vishnu Purana, Bk. IV.; Mahavansu, appendices; Arrian, Anab. IV., 22.

[25] Raja Tarangini, L. VI., sl. 188. Vicramaditya was probably a soldier of fortune under Afumi, for the Raja Tarangini makes Abhimanyu the son of Kshema Gupta, while it does not appear that Vicramaditya ever assumed the Gupta name. At the time of Afumi, the Guptas had become *rois faineants*.

PLATE I.—THE SYLLABARY OF THE ASOKA PROCLAMATIONS.

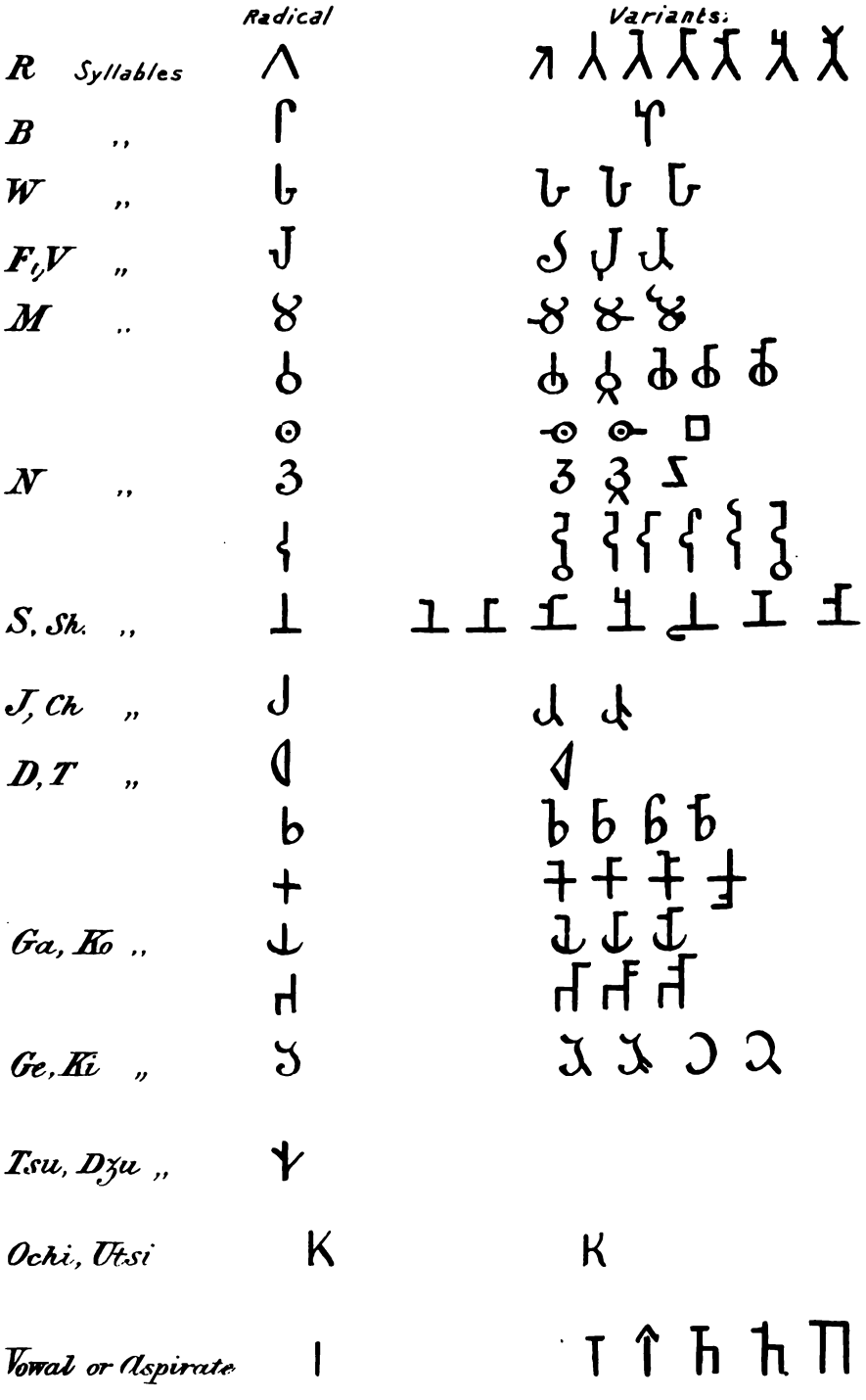


PLATE II.—THE COMMON INDO-HITTITE SYLLABARY.

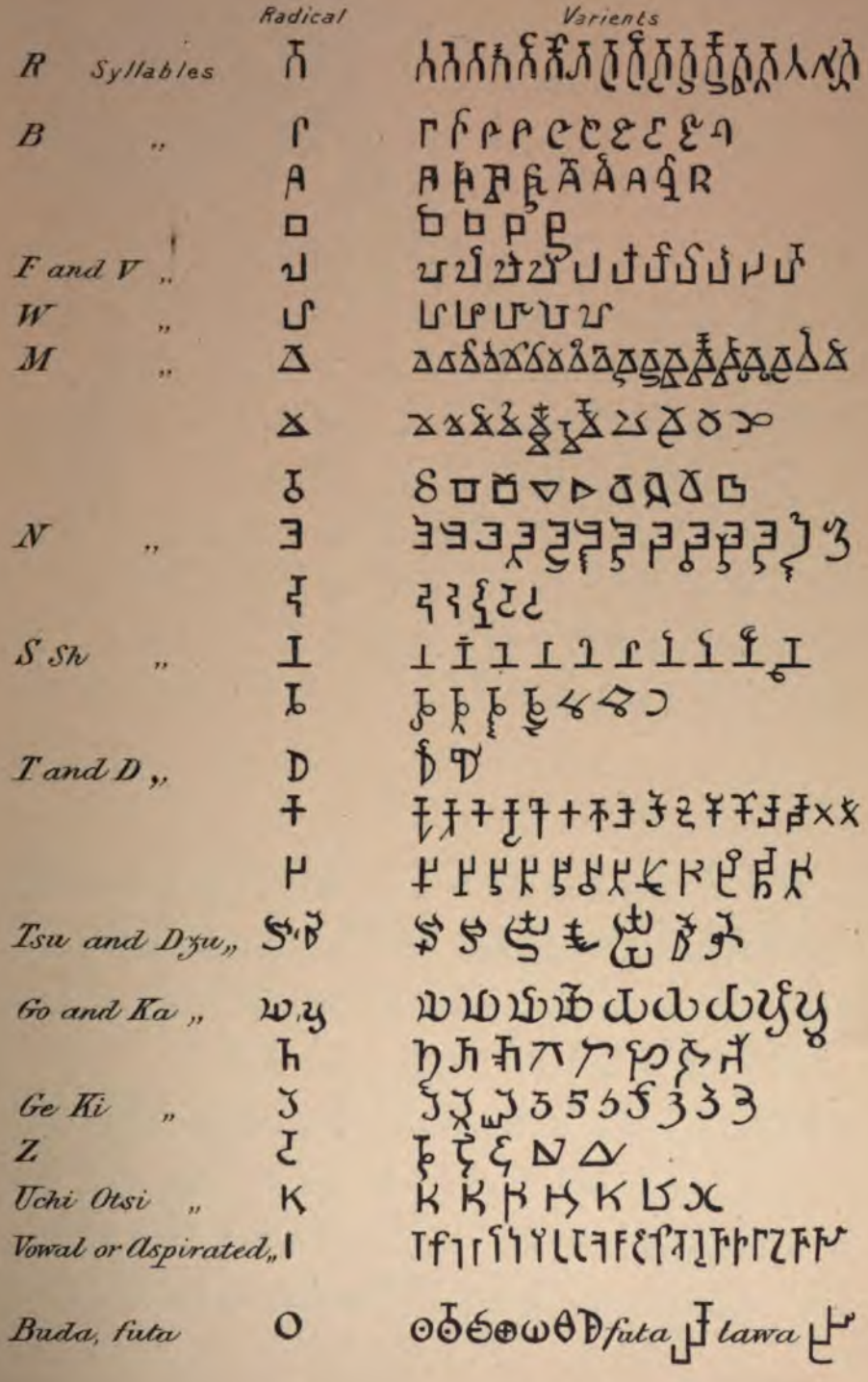


PLATE III.—ASOKA EDICT AT GIRNAR.

PART 1

PART 2

PLATE IV.—INSCRIPTIONS IN THE COMMON INDO-HITTITE CHARACTER.

THE JOURNAL OF CAPTAIN WALTER BUTLER, ON A VOYAGE ALONG THE NORTH SHORE OF LAKE ONTARIO, FROM THE 8TH TO THE 16TH OF MARCH, 1779.

By Captain Ernest Cruikshank.

(Read 7th January, 1893.)

Niagara, 8th March, 1779.—Three o'clock in the afternoon, set off for Canada in a batteau. The weather calm, the season very forward and more than common fine, no appearance of snow, ice, or frost. Rowed to the 12 Mile Pond, encamped; saw this evening a large flock of pigeon in trees and numbers of geese and ducks in the pond.

12 Mile Pond, 9th March.—At six put off, the wind and swell high and ahead; but the hands being good oarsmen kept the lake till the 20 Mile Pond or river, when the wind increasing and no harbour nearer than the 40 Mile Creek, made for the Creek and was near striking on the bar, but the force of the waves on the stern and working briskly of the oars got into the river. An Indian cabin on the bank inhabited by Missassaugas. The 20 Mile Creek is a fine stream, though shallow at the entrance and narrow at the mouth, but very wide a little way up. The land in general level, though higher on the east side. Timber—oak, pine and a few chestnut trees. The place appears as the head of the lake, though it turns for forty miles westerly beyond this before the lake turns to the north-eastward. This creek heads near Point Obino, 18 miles above Fort Erie on Lake Erie, likewise the 12 and 16 mile creeks rise out of the swamp near Lake Erie. Boats can go up this creek about 15 miles. Saw a number of blackbirds. 3 o'clock put off, the wind falling, and rowed till four, hoisted sail and continued till six, rowed till 7 o'clock, put in shore and encamped on a low, sandy beach, five miles from the creek in this bay forming the head of the lake, hauled the boat up the distance from the said creek to Niagara, 60 miles.

10th March.—Put off at daylight, every appearance of a fair wind, rowed an hour, the wind came ahead, increased with a high swell, was obliged to put into the river at the head of the lake, shipped water twice before we made the river, the wind at east. From the west side of 20 Mile Creek the land lowers till you come 12 miles off this, where it forms a fine sandy beach with a few trees near the shore, which continues a

mile beyond this where the shore turns and runs about north-east, whence it is a broken shore with a bank of seven or eight feet and no landing with boats for ten miles. In windy weather a boat may go up this river 10 or 13 miles, whence there is a carrying place of 13 miles into the river Tranche, which falls into the lake of St. Clair. After you enter the river about 400 yards it forms a lake or pond of four miles over and six long. Between it and the lake is a narrow neck of land of 400 yards wide, covered with a few trees and reedy grass; on this the Indians hut in the fishing season. This pond in the season has great numbers of all sorts of water fowl. Round this lake or pond a quantity of hay might be made. This morning about seven, the weather being clear and little or no wind, we saw the spray or mist of the Fall of Niagara, being from this about south-east. A canoe with Missassaugas came to us, gave me ducks, in return gave them powder and shot and bread, they being out of ammunition. I learned from them that Joseph Brant had left his boat here and took two canoes 11 days ago.

Head of the Lake, 11th March.—Got up at daylight, wind still ahead and too hard to put out; amused ourselves shooting ducks and blackbirds. Set in raining at ten this morning. An hour before sunset a thunder gust with lightning and a heavy rain. Thick fog and calm, though still a high swell. Set off a little before sunset. Half an hour out fog cleared off with a hard north-west wind very squally, could not sail, rowed till eight o'clock, the wind and swell too high to go any further this night; put into the 12 Mile Creek with much difficulty. Got into the creek, obliged to drag the boat, water sufficient, but a fall in the mouth of the creek; ten o'clock at night before we could kindle a fire; the ground and wood wet; encamped on a bare point. The wind blew down our tent. Up this creek a sawmill might be erected, having fine rapids and good timber for boards. This creek in the fall is filled with salmon, as all the other large runs of water are in the fall season. From Niagara to this the lake shallow near the shore, though good anchoring ground off in the lake.

12th March.—Set off at seven o'clock this morning; the wind at N.W.; too much off shore to sail; rowed till 11 o'clock; put into the river called the Credit, 17 miles from the last station. The shore in general good for boats to land; the land low and a good beach, except the points, which are bluff. Two Missassaugas came to me and informed me a number of them lived up this river. Gave them bread and put off at 12; rowed to the bay above Toronto; hoisted sail: found the wind too high to go round the long point forming the basin or bay below Toronto. Continuing sailing down the bay to the camping place, unloaded the

boat, hauled her over and loaded again in an hour and a half; rowed from this to the beginning of the high lands, encamped on the beach and secured the boat. Toronto was built on a level spot of ground nearly opposite a long narrow neck or point of land running seven or eight miles into the lake, forming a noble bay of eight or nine miles deep, two or three miles from the bottom of which, on the north side, ships can ride in safety. It's strange the French built the fort where they did and not where their shipping were wont to lay, which was a few miles below the fort down the bay. The bay of Toronto was filled with all sorts of wild fowl. Saw on the north side of the bay several wigwams and canoes turned up on shore. The land about Toronto appears very good for cultivation. From Toronto to the river du Credit it is 12 miles across the bay, but better than 20 along shore, which is the way boats must take except the weather is very calm or a light breeze in your favour. From Toronto to the beginning of the high lands is nine or ten miles down the basin, but nearly double round the point.

13th March.—Got off at daylight; the wind from the land, could not sail, rowed till twelve; passed the high lands and a small bay. Put into Pinewood Creek. Here one Duffin resided formerly, since when a Frenchman has resided here. He went off a little before we came. Two houses a little up the creek, one entire, the other stripped. This creek is famous with the Indians for great quantities of fish. The distance from this to the other end of the highlands is about 20 miles, 15 of which are few or no places where a boat could be saved in case of a storm off the lake, the bank being very high and steep, being a mixture of clay and chalk nearly as hard as freestone; it forms a romantic, wild view, in many places appearing like towns in ruins, the relics of houses, remains of chimneys, etc. From the lake you would take it for a large town built of stone partly demolished. Put off at ten o'clock, rowed till three, the wind fair, sailed till four, rowed till six, no wind; put ashore in a deep bay where we found a fine creek, its water as clear as crystal. Encamped a little up the creek in this bay. I believe vessels might ride with safety from the N.E. or N.W. wind, but not from the S.E. or S.W. The distance from this to the Pinewood Creek is about 30 miles, the lake all along forming small bays in which you have a good beach in which a boat may be secure in case of a storm.

14th March.—Set off at daylight; rowed till twelve; the swell increasing with the wind ahead at east, put into a creek called by the Indians Pamituscoteyank (the fat fire); the distance from our encampment 15 miles; at this creek and two others nearly of the same name

the Indians in the fishing season reside.* All those three creeks head near a lake about 30 miles long, distant from this about 50 miles where the Missassaugas have two villages and where the Canadians in winter send traders. Expresses in winter pass this lake on their way to Canada. Set off at one o'clock, the wind off shore, rowed till two; sailed till night; put into a deep bay; found a creek but could not get in, the stream running very rapid; rowed further in the bay and encamped on the beach; secured the boat. From the Fat Fire Creek to this about thirty miles, the shore and particularly the bays level, and good beaches for boats to land and the points bluff, the lake shoal near the shore.

15th March.—Put off as soon as day appeared and rowed till ten; passed a long point which forms two deep bays, one on either side, of ten miles to the bottom. In the bay to the west falls one of the creeks before mentioned, coming from near the small lake inhabited by the Missassaugas. In those two bays vessels might lay secure from storms on the lake, in the west bay sheltered from the S.E. and N.E. winds, in the east from the W. and N.W. winds. The point runs direct into the lake for four miles at least. You can't see the bottom of the east bay in passing across from the end of the point to the main. This bay has a fine river falling into it from the east, which forms a basin and a narrow entrance into it, occasioned by a narrow neck or sandy beach between the lake and river. At 11 o'clock hoisted sail, the wind off shore; at 10 o'clock passed two islands, the one called St. Nicholas, the other never knew a name nor did I know there was one of St. Nicholas; St. Nicholas is about one half a mile in circumference, the other about half that size. St. Nicholas is about one mile from shore, the other much smaller and about two miles beyond it directly out into the lake, either of which would be a safe retreat for vessels in a storm, these islands are about 12 miles east of the beforementioned point forming the two bays. When the wind is high the boats go within two miles of the bottom of these bays and drag the boats across a point of land about 200 yards wide. The distance from our encampment to the point about 12 miles, from the point to St. Nicholas Island about 10 miles. Continued sailing till night, put in shore and encamped on a low point where we found a fine creek and a good harbour in a pond for our boat. Since this morning a great number of wild fowl. From the island to this is about 25 miles; the shore much the same as yesterday, the points not so bluff.

March 16th.—Put off our boat very early, much ice which had formed last night, the wind ahead and partly from the shore which partly drove

* Long, in his travels, p. 78, and elsewhere, mentions this place by the name of Pimistiscotyan Landing. He apparently resided there for some time.

the ice into the lake; rowed till 9 o'clock; came up to the Duck Islands and saw the islands called the False Ducks about south from the real Ducks; the distance I take to be better than 12 miles between the real and the False Ducks as they appear from here. The vessels, if I remember well, made the distance more. Those islands afford a safe retreat for vessels in case of a storm. The islands are much alike, about a mile round and nearly circular distant from the main, four miles and from each other one. The weather calm, rowed across a very deep bay of 20 miles down and about ten directly over. This bay is much larger if taken from the point of a large island to the east and the Ducks to the west part of the main, and the large island on the east side of the bay from the Ducks appears like a number of small islands and in many places a single tree is only seen. Many persons not acquainted with the passage have taken down the bay supposing it to be the entrance of the river, and in coming from the river have imagined the main to the west to be islands from its appearance, and go likewise down this bay. Traders go in two days to the before mentioned small lake inhabited by the Missassaugas. Continued rowing till the mouth of the Caderouqua Bay, the wind coming fair sailed into Caderouqua harbour. The distance from our encampment to Caderouqua about 32 miles, the land in general very low and swampy back; the points rocky and shallow for some way out. There is so much of a sameness in the appearance of the land from the highlands to the river that a few miles off in the lake there is no knowing one place from the other. Nothing but the walls of the barracks and houses remain of the Fort. It appears never to have been a place of strength, neither do I think its situation will admit its being made so, the land very stony and ground back to command it. It has a fine safe harbour for shipping. The little island opposite the Fort improved in the French time is now covered with small trees.

I am told vessels cannot sail out of Caderouqua to the lake but with a north or north-west wind. An east and south wind are fair winds for ships once clear of the river to Niagara. The above are all the observations I made on the north shore of Ontario, which would have been more perfect but for the severity of the weather, which prevented me taking notice of many parts of the shore, neither did I think these remarks would have been seen or would have been more particular.

MEMOIR OF CAPTAIN WALTER BUTLER.

BY CAPTAIN ERNEST CRUIKSHANK.

(Read 7th January, 1893.)

Walter Butler, the author of the foregoing journal, was a man of sufficient note to receive mention in nearly every history of the American Revolution and most of the larger histories of the United States as well. Unfortunately for his reputation, the story of his share in the struggle has invariably been written from a hostile point of view. By his enemies he was regarded as a fierce, cruel, and implacable adversary, delighting in bloodshed and ruin. What he seemed in the eyes of his friends and comrades has never been told.

The eldest son of Lieut. Col. John Butler, afterwards so widely-known as the commandant of the famous corps of rangers bearing his name, he is supposed to have been born about the year 1750 on his father's farm of Butlersburg, in the valley of the Mohawk, near Johnstown. At the outbreak of the revolutionary movement he was, therefore, about twenty-five years of age, and had been admitted to the bar of the Province of New York. Judge Jones, the author of a history of New York during the Revolution, who knew him as a law student, describes him as "a youth of spirit, sense, and ability." Another authority speaks of him as a "pretty able young lawyer." His name appears as one of the two attorneys who signed the protest of the Loyalists of Tryon County in March, 1775. During the summer of that year he accompanied Guy Johnson to a Council of the Six Nations at Oswego, and afterwards went with him to Montreal to aid in the defence of Canada. His zeal and activity as a Loyalist must have already given him some prominence, as popular rumour named him as one of the leaders of the Indians who were expected to make a descent upon the Mohawk valley at that time.

Very shortly after his arrival at Montreal he received a commission from General Carleton, the governor of the province, as ensign in the 8th or King's regiment. In company with Lieut. Peter Johnson of the Indian department, he gained distinction in the skirmish on the island of Montreal, which resulted in the defeat and capture of Ethan Allen, by leading a party of thirty rangers and Indians against the flank of the enemy at a critical moment. This movement threw them into confusion and decided the fate of the day. The traveller Long names the same

two officers as being in command of a small party of whites and Indians of whom he was one, that defeated a superior force of Americans near Isle Aux Noix soon afterwards, taking many prisoners. Butler then drops out of sight for a year.

He appears to have gone with his father to Fort Niagara, where a part of his regiment was stationed, and remained there until the spring of 1777. The monotony of garrison duty in a lonely frontier fort became insupportable and he begged eagerly for employment in the field. Carleton wrote approvingly in reply to Captain Lernoult (2nd February, 1777,) "Ensign Butler has testified a desire to serve, for which he is much to be commended, and as he seems a promising young man, in case any part of the regiment moves in the spring, I should be glad he was to accompany them." Accordingly he was one of the officers of that regiment selected for the expedition against Fort Stanwix in the summer of that year. In July he was appointed captain of a company of Loyalist refugees enlisted by his father to serve as rangers with the Indians and with the special object of "controlling and restraining them from committing acts of cruelty." In command of this he took part in the bloody battle of Oriskany, in which General Herkimer's relieving force was defeated. His knowledge of the country and the people then caused him to be selected by Colonel St. Leger to carry a flag of truce and a proclamation of amnesty to the inhabitants of the German Flats who were reported to be anxious to return to their allegiance. A large number of these had accordingly assembled at the house of Rudolph Shomaker, a magistrate and a Loyalist, but who had remained inactive, within two miles of Fort Dayton, and Butler was addressing the gathering when the house was surrounded by the advance guard of General Arnold's army on its march to relieve Fort Stanwix and he was taken prisoner with the whole of his party. Heedless of his flag of truce and the purpose of his visit, Arnold directed him to be tried by a drum-head court-martial as a spy. That compliant tribunal promptly found him guilty and sentenced him to death although he produced his instructions and commission as an officer of the British army. Arnold at once approved their finding and ordered the sentence to be executed next morning. But a number of officers of the 1st New York regiment startled at such severity petitioned for a respite, which was finally granted, and he was sent a close prisoner to Albany. He was there confined in a small and filthy cell in the common jail, heavily ironed and treated with the utmost harshness. In the course of some months he became seriously ill. Col. Butler declared his belief that he was treated with such extraordinary severity simply because he was his son, and naturally made every effort to obtain his exchange. Fortunately, General

Schuyler, whose enmity to the Loyalist party was most bitter, was relieved about that time by the Marquis de la Fayette in the command at Albany. A number of the inhabitants who had known Walter Butler as a student in that town, sympathizing with his sufferings, seized the opportunity to petition for his removal to more comfortable quarters. They asserted that his life would be in great danger if he remained where he was much longer. He was soon afterwards removed to a private house under a strong guard. The sentence of death, however, still remained suspended over his head. About the end of April, 1778, he made his escape; a horse was provided for him by his friends and he rode out a free man into the valley of the Mohawk, where all the roads were known to him from boyhood. Although weak and greatly emaciated, he accomplished the perilous journey of nearly four hundred miles to Fort Niagara in safety, At the Seneca village of Canadasaga (near the present town of Geneva. N.Y.) he found his father encamped with his corps of rangers swelled by new recruits to upwards of 200 men. Col. Butler was preparing for his descent upon Wyoming, but observing that his son was quite unfit for service in the field, he despatched him to Quebec in the hope that the journey would re-establish his health. He travelled swiftly. On the 17th of May he arrived at Niagara; on the 4th of June he laid before General Haldimand, in Quebec, a careful memorandum describing the movements of the rangers and Indians, and stating his father's proposals for adding two companies of French Canadians to his regiment, for the purpose of counteracting the efforts of La Fayette and other French officers to detach the Six Nations.

Sir John Johnson's correspondence with his brother-in-law, Daniel Claus, throws some striking and suggestive light upon the heartburnings and intrigues which prevailed among the Loyalists themselves. The letters of both constantly breathe a spirit of most intense hostility to the Butlers.

On the 29th of June, Johnson wrote:—"Young Butler attends at Headquarters constantly, though I cannot perceive there is any great notice taken of him. He says he waits orders before he can proceed up the country. I should be sorry his flight should occasion the death of any of our poor friends."

Again, on the 16th of July, he said:—"I have given him (General Haldimand) a very plain and honest account of Butler and his son, not concealing a single circumstance of his whole conduct which has come to my knowledge, and I think I can discern that a change in his opinion of this great man's merit and services will surely take place, if not already the case. He asked me yesterday what he would be about all this time;

that he thought he would have struck a blow ere now. I told him I thought I might venture to assure him that it was not his intention ; that he would remain where he was or thereabouts till he could join the army from York with safety, or till it would be too late to do anything. He told me the other day that young Butler was a pretty genteel man. I took the opportunity to give my opinion of him pretty freely."

Walter Butler did not return to Niagara till the end of July, and consequently had no part in the destruction of Wyoming. Soon after he joined his company at Oquaga, an Indian village near the east branch of the Susquehanna, his father was forced by a severe attack of rheumatism in the head to hand over to him the command of the entire corps and leave the Indian country altogether for the remainder of the year. During August, the main body of the rangers remained in the vicinity of Oquaga in readiness, if a favourable opportunity offered, to make a raid on the enemy's frontier, or if need be to protect the Indian villages from attack, but their scouts and reconnoitering parties ranged the entire border from the Susquehanna to the Mohawk and Oswego. Early in September an avenging force from Wyoming advanced in the direction of the Seneca country, but retired after burning two small villages before Butler could gather a party strong enough to attack it with any prospect of success. When he found that the invaders had evaded pursuit he sent Captain Caldwell with the main body of the rangers to destroy the German Flats, where extensive magazines of provisions had been formed for the supply of the enemy's army and garrisons in New York. This was swiftly and thoroughly accomplished without the loss of a man. During Caldwell's absence Butler continued to collect the Indians and enlist recruits for the rangers, with the intention of dealing a still more effective blow at Cherry Valley, where a great quantity of grain and many cattle were collected for the use of Washington's army. This movement was delayed by the sudden advance of a second column of nearly 1400 men from Wyoming which reached and destroyed the village of Oquaga, but then hastily retired. Captain Butler had awaited the invaders' approach at Canadasaga, where he was joined by 400 Senecas and a few volunteers from the King's regiment in garrison at Fort Niagara. When the Americans commenced their retreat he felt that the time had arrived for his counter-stroke at Cherry Valley, if it was to be executed that year, for it was already the beginning of November. The forest paths were fast becoming impassable, and the settlement he designed to attack lay within sixty miles of Albany. He began his march at once with 200 rangers and volunteers and 321 Indians. The journey was tedious and fatiguing from the condition of the roads and stormy weather. On the 9th of November they met and captured the whole of a scouting party,

composed of a sergeant and eight men sent out from Cherry Valley, by whom they were informed that the garrison, consisting of a Massachusetts regiment of continentals, numbering 300 men and 150 local militia, occupied a strong palisaded fort near the centre of the settlement, but that most of the principal officers lodged in a house about a quarter of a mile outside its walls. They had already been warned of Butler's approach by an Oneida Indian, but apparently felt quite secure against any attack.

When darkness overtook Butler's party next evening they had advanced by a forced march within six miles of the fort, and he proposed to the Indians that as soon as the moon rose they should make a dash forward and surround the officers' quarters while he attempted the surprise of the fort itself with the rangers. To this the chiefs readily agreed, but it then began to rain heavily, and the Indians at once scattered for shelter in a pine wood and obstinately refused to move an inch till morning. It was then decided to send Captain McDonnell with fifty picked rangers and a body of Indians to surround the house where the officers lay and cut off all communication with the adjacent settlement, while Butler himself, at the head of the remainder, made a rush for the fort. They had advanced with this intention quite unobserved along a bye-path until within a mile of the place, when some Indians in front fired at two men cutting wood. One of these escaped, although badly wounded, and gave the alarm by his cries as he ran. The remainder of the Indians rushed off in pursuit as soon as they heard the sound of the firing and gained a long start of the rangers, who were halted for an instant by their officers to reprime their rifles. The major of the Continental regiment, with one or two others, succeeded in getting into the fort, but Colonel Alden, five other officers, and twenty men were killed in the attempt, and Lieut.-Col. Stacy, three subalterns, and ten privates were taken prisoners. The colours of the regiment were abandoned in the house and burnt with it in the general scène of destruction which followed. The garrison of the fort, to favour the escape of their officers, opened a fire of both cannon and musketry upon their pursuers, and although this was briskly returned by the rangers for ten minutes all hope of taking the place was seen to be futile.

In spite of the greatest efforts on the part of the officers in charge of them the Indians at once dispersed in small parties, killing the inhabitants or taking them prisoners, and plundering or burning their houses. A vigorous sally of even a small part of the garrison might be sufficient to drive the whole in headlong flight from the valley. To guard against the evident danger to which they were exposed by their own heedless-

ness and misconduct, as well as to provide for the safety of his own men, became Butler's first duty in this distressing situation. He quickly assembled the rangers, and after destroying an abandoned blockhouse, took possession of a rising ground near the fort. It was then about noon, and he found it necessary to retain possession until nightfall, while his men were stiffened with cold and drenched by the pitiless November rain. Meanwhile the valley for many miles was ablaze with burning houses. Released from the constraint imposed upon them by the presence of the troops, the Indians quickly threw off the control of their chiefs, and the handful of white officers attached to them, and began to execute indiscriminate vengeance for the recent destruction of their villages. Many of the hapless inhabitants, including some women and children, were killed, and the lives of the remainder saved with much difficulty. When at last night came, Butler ventured to retire about a mile, having for six hours overawed by his defiant attitude a force of at least double his numbers, which had every incentive that passion could furnish to leave their intrenchments and attack him. He next rescued as many of the prisoners as possible from the hands of their captors. Large fires were built for their comfort, and they were protected by a strong guard during the remainder of the night.

At day-break, Captain McDonnell, with fifty rangers, and Brant with an equal number of Indians, were despatched to complete the work of destruction. The remainder of the Indians and the weakest men among the rangers were directed to begin their retreat in charge of a great herd of captured cattle destined for the supply of the famished garrison of Fort Niagara. The main body of the rangers was formed near the fort to repel a sortie. But even the sight of fresh ravages failed to draw out the garrison, and when at length every building outside the fort was consumed, Butler quietly began his homeward march. So slight had been the resistance they encountered that only two rangers and three Indians were wounded.

Before he finally left the valley Butler released seven men, ten women, and thirty-two children whom he had recovered from the Indians with a letter addressed to General Schuyler, in which he said :—

" I am induced by humanity to permit the persons whose names I send you herewith to remain, lest the inclemency of the season and their naked and helpless situation should prove fatal to them, and expect that you will release an equal number of our people in your hands, amongst whom I expect you will permit Mrs. Butler and family to come to Canada, but if you insist upon it, I do engage to send you moreover an equal number of prisoners of yours taken either by the

rangers or Indians, and will leave it to you to name the persons. I have done everything in my power to restrain the fury of the Indians from hurting women or children, or killing the prisoners who fell into our hands, and would have more effectually prevented them but they were so much incensed by the late destruction of their village of Oquaga by your people, and shall always continue to act in that manner, as I look upon it beneath the character of a soldier to wage war upon women and children.

"I am sure you are conscious that Col. Butler or myself have no desire that your women or children should be hurt.

"But be assured, sir, that if you persevere in detaining my father's family with you that we shall no longer take the same pains to restrain the Indians from hurting prisoners, women and children, that we have hitherto done."

In his despatch to Colonel Bolton, he frankly admitted the shocking misconduct of the Indians. "I have much to lament," he stated, "that notwithstanding my utmost precautions and endeavours to save the women and children, I could not prevent some of them falling victims to the fury of the savages. They have carried off many of the inhabitants and killed more, among them Colin Cloyd, a very violent rebel. I could not prevail on the Indians to leave the women and children behind, though the second morning, Captain Johnson (to whose knowledge of the Indians and address in managing them I am much indebted) and I got them to permit twelve who were Loyalists, and whom I had concealed with the humane assistance of Mr. Joseph Brant and Captain Jacobs of Oquaga, to return. The death of the women and children upon this occasion may, I believe, be truly ascribed to the rebels having falsely accused the Indians of cruelty at Wyoming. This has much exasperated them, and they are still more incensed at finding that the colonel and those who had laid down their arms, soon after marching into their country intending to destroy their villages, and they declared they would be no more falsely accused of fighting the enemy twice, meaning they would not in future give quarter."

Apparently the only reasonable foundation for the odium which has been so long attached to Walter Butler's name, is the charge that he connived at, or it is even said, encouraged the cruelties of the Indians on this occasion. This he indignantly and vehemently denied at every opportunity. When at length a tardy reply was received from General Clinton in February, 1779, to his letter to General Schuyler already cited, levelling a distinct accusation against him and other officers, but

assenting to the proposed exchange of prisoners, he warmly replied at once in these terms :—

" We deny any *cruelties* to have been committed at Wyoming, either by whites or Indians; so far to the contrary that not a man, woman or child was hurt after the capitulation, or a woman or child before it, and none taken into captivity. Though, should you call it *inhumanity*, the killing *men in arms in the field*, we in that case plead guilty. The inhabitants killed at Cherry Valley do not lay at my door; my conscience acquits me. If any are guilty (as accessories) it is yourselves; at least the conduct of some of your officers. First, Col. Hartley of your forces sent to the Indians the enclosed, being a copy of his letter charging them with crimes they never committed, and threatening them and their villages with fire and sword and no quarter. The burning of one of their villages, then inhabited only by a few families—your friends—who imagined they might remain in peace and friendship with you, till assured a few hours before the arrival of your troops that they should not even receive quarter, took to the woods; and to complete the matter, Colonel Denniston and his people appearing again in arms with Colonel Hartley, after a solemn capitulation and engagement not to bear arms during the war, and Colonel Denniston not performing a promise to release a number of soldiers belonging to Colonel Butler's corps of rangers, then prisoners among you, were the reasons assigned by the Indians to me after the destruction of Cherry Valley for their not acting in the same manner as at Wyoming. They added that being charged by their enemies with what they never had done, and threatened by them, they had determined to convince you that it was not fear which had prevented them from committing the one, and that they did not want spirit to put your threats against them in force against yourselves.

" The prisoners sent back by me, or any now in our or the Indians' hands, but must declare I did everything in my power to prevent the Indians killing the prisoners or taking women or children captive, or in any wise injuring them. Col. Stacy and several other officers of yours when exchanged will acquit me, and must further declare that they have received every assistance before and since their arrival at this post that could be got to relieve their wants. I must, however, beg leave by-the-by, to observe that I experienced no humanity or even common justice during my imprisonment among you."

There seems to be no just reason to doubt the truthfulness of his defence. Even had he been abnormally deficient in humanity the simple fact that his mother, three brothers, and a sister were held as hostages by his enemies, besides fifty other women belonging to the families of some

of the principal officers of the rangers and Indian department, must have operated as a powerful motive to induce him to exercise all possible restraint upon the Indians, and his instructions were most direct and explicit upon that point.

Owing to the lamentable slaughter attending it, General Haldimand expressed but a qualified approval of the expedition, while he warmly commended the conduct of its leader. In a letter to Colonel Butler of the 25th December, 1778, he said:—"I have received Captain Butler's relation of the operations at Cherry Valley, the success of which would have afforded the greatest satisfaction if his endeavours to prevent the excesses to which the Indians in their fury are so apt to run, had proved effectual. It is, however, very much to his credit that he gave proofs of his disapprobation of such proceedings, and I hope that you, and every officer serving with the savages, will never cease your exhortations till you shall at length convince them that such indiscriminate vengeance even upon the cruel and treacherous enemy they are engaged against, is as useless and disreputable as it is contrary to the disposition and maxims of the king in whose cause they are fighting."

In March, 1779, Captain Butler was again despatched to Quebec with the pay-lists and accounts of his regiment. It was during this journey that he made the notes which have been already read. On the 10th of May he touched at Carleton Island on his return. Ten days later he was again at Fort Niagara. When he arrived, his father, with the main body of his corps was a hundred miles away in the heart of the Indian country, and Col. Bolton, having been informed that an expedition was preparing at Fort Pitt against Detroit, directed him to proceed at once to the latter place with twenty-five rangers in the hope of rousing the western Indians for its defence. Later information changed his route in the direction of Venango and Presque Isle for the purpose of alarming the garrison of Fort Pitt. He appears to have spent the month of June among the Indians of the Ohio or in hovering on the western frontier of Pennsylvania, but before the middle of July he rejoined his father at Canadasaga. When he arrived there he found that many of the Indians were absolutely starving, and the rangers were living on scanty supplies of salt provisions brought painfully by batteaux and pack-horses from Niagara. At length, when his men were suffering "everything that hunger and disease could inflict," and being reluctantly driven to the conclusion that if they remained there any longer they must soon become totally unfit for duty, Colonel Butler instructed his son to take command and march to the Falls of the Genesee while he remained alone among the Indians and undertook the difficult task of

keeping them in spirits. The place selected for the encampment of the rangers was much more convenient for the supply of provisions from Niagara, and fish abounded in the river. There is yet in existence a laconic note, written by Walter Butler at this place on the 3rd of August, 1779, to Francis Goring, at Fort Niagara, in which he says:—

"I am obliged to you for the hooks, for sure it is that he that will not hunt or fish, must not eat."

While encamped at the Genesee he learned with great indignation and pain that Lieut. Henry Hare and Sergt. Newberry, of the rangers, had been taken prisoners while scouting and hanged in cold blood by the enemy in front of Hare's own house. In the heat of his resentment he penned a strong remonstrance to General Haldimand, protesting that unless steps were taken by him to restrain the enemy from the commission of such barbarous deeds the rangers themselves must be forced to retaliate in self-defence.

The advance of General Sullivan's army compelled him to march hastily to the Chemung river to oppose the invaders. On the 15th of August the rangers were encamped at Chuckmet, within fourteen miles of the enemy. On the 29th, he commanded them in the battle near Chemung, or Newton, and when forced to retire by superior numbers brought them out of action with very slight loss, although at one time nearly surrounded. On the 10th of September he was at Canadasaga with Rowland Montour and a handful of Indians watching the movements of the Americans, and covering the retreat.

In November, he again accomplished the fatiguing journey to Montreal to settle the regimental accounts; and to facilitate the exchange of his father's family, which had at length been arranged. On this occasion he was accompanied by Captain John McDonnell, of the 84th, then serving with the rangers. One of Butler's letters gives a stray glimpse of their life in that town during the winter. "We do little else but feasting and dancing," he remarked, with heroic disregard of the English grammar "It has nearly turned my head; I find it as hard as scouting. In order to change the scene, McDonnell and me intend to make the tour of the mountain every other day on snowshoes."

McDonnell returned to Niagara early in the spring of 1780, but from some unexplained cause, probably ill-health, Butler was detained at Montreal until the beginning of July. However, on the 24th of that month he was again at Fort Niagara, busied in building quarters for his regiment. Apparently his health was too much impaired to permit him to take the field, and on the 30th of September, on the eve of a most

important raid upon the Mohawk Valley, in which the entire available force of the rangers was engaged, his father stated that he was so ill that he had given him permission to go down to Montreal. In December he returned, and spent the winter at Fort Niagara. In April, 1781, he again went down on regimental affairs.

On the 30th May, he informed Major Matthews that he had arrived at Niagara in eight days from Montreal. "The journey has fatigued me not a little," he added, "and returned the ague on me, but this I owe to falling into the water more than travelling. However, I am feeling better, and I hope with care and thinking that something may be done in the active line in some part of the province to get the better of it, but I fear we shall be idle in this quarter. Clark is not in earnest. Should Allen and his Green Mountain Lads return to their duty I would wish, if it would be for the good of the service, a few companies of the rangers were sent to join them. I should like the service, as being convinced we should be doing essential service in that quarter. I have now given over all prejudices against serving with persons who were formerly our enemies. The good of the service requires we shall give up sentiments of this kind."

In July, he again earnestly entreated to be ordered on active service. A few weeks later he complained with bitterness that "the rangers are made drudges of for Mr. Stedman (contractor at the portage) and others."

After months of weary waiting the coveted opportunity for seeking distinction arrived. In the beginning of October he was ordered to take command of a detachment of ten officers and 160 men of the rangers, and join Major Ross at Oswego, for a descent on the Mohawk Valley. The particular object of this expedition was the devastation of the country at Duanesboro', within eight miles of Schenectady, the only part of the entire valley that had hitherto escaped the ravages of war and which, indeed, was thought by its inhabitants to be perfectly secure from invasion, lying in a central situation between that town, Fort Hunter and Schoharie, all of which were strongly garrisoned and fortified. Consequently the attempt would be attended with great hazard. The force employed consisted of 420 soldiers of six different corps and a hundred Indians. Success and even the lives of the party must depend on the speed and secrecy of their movements. The soldiers were all picked men, selected with an eye to their marching qualities and the endurance of fatigue, but the Indians were the "refuse of the tribes."

Their orders were to destroy effectively "all kinds of grain and forage, mills, etc., and all articles which can contribute to the support of the

enemy. They will as usual have the strongest injunctions to avoid the destruction of women and children, and every species of cruelty."

After a harassing march of eight days, in most distressing weather, they gained the Mohawk River by a very circuitous and unfrequented route, as much to the surprise of the panic-stricken inhabitants as if they had sprung out of the earth itself, although they had been forewarned of their arrival at Oswego. Their appearance at Corrystown on the morning of the 24th October was known in a few hours in all the surrounding forts. There they took a number of prisoners, by whom they were informed that there were 600 militia and 400 regular troops at Schenectady, 500 at Schoharie, and 400 more at Canajoharie, besides garrisons in twenty or more smaller forts along the river. They were consequently threatened by the attack of a force at least four times their number and in a manner surrounded by enemies. Major Ross saw that he must make a forced march during the night if he hoped to reach his destination unmolested. The rain fell in floods and the roads were rapidly becoming almost impassable for his jaded troops, still the fourteen miles that lay before them were accomplished before dawn, but although they struggled manfully to keep together and help along their weaker comrades, several became so completely exhausted that they had to be left by the roadside to the tender mercies of an exasperated enemy. They were allowed to rest on their arms for an hour, and at daybreak the work of destruction began. The Indians and a party of rangers were detached for this purpose, while the remainder of the column marched along the road to support them. The settlement was found entirely deserted. By ten o'clock the devastation of the country for seven miles along the river was completed. Three mills, a public granary, a hundred farm houses with their out-buildings were in flames. The troops then reassembled about twelve miles from Schenectady and retraced their steps to Fort Johnson. Shortly after noon they crossed the river there with some difficulty, as the garrison sallied out to oppose the passage, but the commanding officer being killed his men retreated hastily to the shelter of their works. The British column then marched rapidly through the streets of Johnstown under fire from the stone jail as they passed, and halted in the fields beyond the hall for an hour or two to collect provisions. Major Ross then directed Captain Tice with the Indians to lead the way by the nearest route to Carleton Island, carefully concealing his intention from all others to prevent deserters or prisoners giving information to the enemy. He had sent out scouting parties but they failed to gain any intelligence of the movements of the enemy. However, Colonel Willett, who had advanced to Caughnawaga with 500 regulars and a hundred militia the day before, was already close in pursuit. The Indians

had penetrated about a mile into the forest back of Johnstown, and the rear of the column was just entering it, when this force appeared in such a position that Ross saw that he must fight or permit the rear-guard to be cut off. Accordingly he hastily formed his men to receive the attack about a quarter of a mile after entering the woods. Exclusive of the Indians, very few of whom could be induced to return to the fight, he had 354 officers and men in line.

Willett's force had been largely increased during his advance by the junction of fresh troops from Schenectady and other places, and had become so numerous that he was enabled to detach a large party by a path through a swamp to turn the flank of the British and cut off their retreat. His scouts on penetrating the woods were greeted by a volley from the rangers and Indians, who charged at once with their usual yells and whoops and drove them headlong into an open field where the main body was drawn up with two field pieces. Pressing forward rapidly in support, Ross charged it with his entire force and Willett's men instantly gave way, abandoning one of their guns and much ammunition. In the pursuit, which was continued for half a mile, a number of prisoners was taken and many were killed, others owing their escape solely to the weariness of their assailants. So complete was the rout that Major Ross asserted that if the Indians had behaved with any spirit at this moment he could have "crushed the spirit of the rebels on the Mohawk."

As it happened, few of the Indians ventured to leave the shelter of the woods. Colonel Willett with that part of his force which still remained unbroken took up a new position on a rising ground on the flank of the rangers, whence he annoyed them so much by the fire of his remaining field piece and musketry that they were forced to discontinue the pursuit and return to dislodge him. While hotly engaged with this body, the detachment Willett had sent to intercept their retreat issued suddenly from the woods on their right and rear. Obliged to face about to oppose this fresh attack, they drove this party back into the woods, from which, however, they kept up an intermittent but harassing fire for some time. They were briskly pursued and nearly surrounded, but darkness enabled most of them to escape. On this Willett retreated to Johnstown, re-crossed the bridge, and occupied the stone church built there by Sir William Johnson, where he stood on the defensive. The actual loss of the British in killed and wounded was trifling, but about twenty men were so completely worn out by hunger and fatigue that they were unable to continue the march.

The next morning Major Ross resumed his retreat, but owing to the weariness and half-starved condition of his men, who were then put upon

a daily allowance of half a pound of horseflesh and a few handfuls of corn, his progress was necessarily very slow. On the third day they struck the trail leading from the German Flats to Carleton Island, in the midst of a blinding snow storm. The Indians then parted company, taking the direct road to Oneida Lake to recover their boats. Meanwhile Willett had followed in pursuit with 500 picked men, including many Oneida Indians, and when Ross was preparing to cross Canada Creek, appeared unexpectedly in his rear. Captain Butler with a few of the rangers promptly engaged the pursuers to cover the passage of the stream, then much swollen by rain. In the performance of this service he was killed, with three of his men. Major Ross said that he behaved very gallantly, but gave no particulars of his death. Willett reported that he was shot in the eye and instantly killed. A tradition which has been repeated by various writers ran to the effect that he was mortally wounded by an Oneida Indian and begged for quarter. The Indian retorted "Cherry Valley quarter," and immediately killed and scalped him. On this tale the stamp of fiction is evident. Benton, in his "History of Herkimer County," has recorded a more probable version. A dense fog hung over the stream when the Americans reached it, but as they attempted the ford, it drifted away and exposed them for a moment to the fire of the British covering party on the other bank, which killed several men and compelled the remainder to retire to the shelter of the woods. The fog again settled down, and several volleys were fired across the creek quite at random. When the rangers retired, they crossed unopposed and found Butler lying dead. He was recognized by an Indian, and Benton grimly adds that "the scalping part of the tragedy was probably performed in the best style of Indian execution."

Observing that his pursuers had the advantage of the ground and an opportunity of firing at a distance, Ross retired to the first favourable position, when he sent the sick and wounded to the rear and waited an hour for a renewal of the attack. The retreat was then continued with such rapidity that his men quite distanced the enemy, and marched, or rather ran thirty miles with scarcely a halt. A seven days' journey through a barren wilderness intersected by several streams, passable only on rafts, still lay before them, and they had lost or thrown away most of their blankets and packs, yet this was accomplished with little actual loss of life, though at the price of tremendous physical discomfort and suffering.

Walter Butler's activity and importance had been greatly exaggerated, and his death became the subject of general rejoicing among his enemies. Willett, of course, was not inclined to underrate his own services, and thinking that this event reflected great credit upon him, declared that in

four years Butler "had exhibited more instances of enterprise, had done more injury, and committed more murders than any man on the frontiers. Such was the terror in which he was held by the inhabitants of the frontiers, so cruel an enemy had he been to them that although Cornwallis's surrender took place about this time, yet the inhabitants expressed more joy at the death of Butler than at the capture of Cornwallis." Local traditions were long associated with his memory, and fifty years later the scene of his death was still known as Butler's ford. Still, with the single exception of the attack on Cherry Valley, he had had no share in the numerous incursions of the rangers. Caldwell, McDonnell, and others were much more active. But there was something in this man's personality that riveted the attention of friend and foe.

Haldimand, reporting his death to Lord George Germaine, spoke of him as "a very zealous, enterprising, and promising officer," and in another letter he expressed the hope that "Colonel Butler's good understanding, and the honourable cause in which his son fell, will console him in this heavy bereavement."

That he was not squeamish about bloodshed in fair fight is evident, but the other charges of cruelty laid against him appear to rest on the flimsiest of evidence. Quite recently he has been condemned for permitting himself to be employed in conjunction with the Indians at all. The same censure must rest upon Montcalm and Frontenac, on Sir William Johnson and Washington, on Brock and Drummond, and a host of others.

EARLY TRADERS AND TRADE ROUTES, 1760–1782.

(SECOND PAPER.)

By Capt. Ernest Cruikshank.

(Read 25th February, 1893.)

A most serious interruption to the fur trade during the revolutionary period, though fortunately of brief duration, was occasioned by the invasion of the Province of Quebec by the Americans in 1775-76. The merchants of Montreal attempted to guard against this by entering into a treaty with the invaders when they found that further resistance was useless. The third clause of the terms of capitulation, prepared on the 12th of September, 1775, by a committee of citizens, of which merchants of such eminence as James McGill and James Finlay were active members, reads thus :—

"That the trade in general, as well within the province as in the upper countries and parts beyond the sea, shall be carried on as freely as heretofore and passports shall be granted for that purpose."

To this, General Montgomery replied: "As far as it may consist with the safety of the troops and the public good, I shall be happy to promote commerce, and for that purpose to grant passports as heretofore."

General Wooster, who succeeded to the command of the army of occupation upon Montgomery's death, almost immediately withdrew the pledge so readily given by his predecessor.

"In January last," he informed a committee of Congress in a letter of the 5th of July, 1776, "I called the Indian traders of Montreal together and enquired of them whether they expected passports in the spring to carry their goods, etc., into the Indian country as usual; they told me they expected that indulgence, but at any rate they should be permitted to carry provisions to their people in the upper country. As I apprehended the granting of passports for the upper country might be attended with unhappy consequences to the interest of the united colonies, as goods they make use of for that trade were much wanted for our army, and there was the greatest reason to expect that by this way our enemies would be supplied with everything they wanted, I did not incline to grant passports without the direction of Congress. I therefore advised them to choose a committee to wait upon Congress for their

direction. They sent Mr. Frobisher, who did not return till the month of April. Soon after I was informed that the merchants were determined to send off their goods in the spring with or without passports, upon which I gave out a general order prohibiting the carrying of any coarse goods out of the city, except such as were needed by the country-people."

When forwarding the petition from the Montreal merchants, borne by Frobisher, General Schuyler prudently took care to represent the situation in such a light as to effectually destroy all its chances of success.

"Mr. Frobisher," he wrote to the president of Congress on the 20th of February, 1776, "delivered to me a letter, signed by himself and several others, containing the substances of the memorial he will present, and requested the mediation of my good offices with Congress. I am very apprehensive, sir, that if these people shall be permitted to go into the Indian country they might, if unfriendly to our cause, be very prejudicial to it, and the sending of such a quantity of provisions will strengthen the enemy at Detroit and Niagara, for by whatever route they go it will be seized by some one of the garrisons and appropriated to their own use. Mr. Frobisher's letter urges the danger of their traders starving if a supply of provisions was not sent up. That may be the case if they were to remain there another year; but the same letter observes that what is sent away in the month of May seldom arrives in the trading country before the winter sets in. If this be a fact, then they have now near a twelve months' provision, and by sending up two or three canoes express (navigated by persons we can depend upon), these traders may be brought away, and their provisions will suffice at least until they can reach Detroit, where they can be in no danger of starving."

The British merchants of Montreal had already given decisive evidence of their loyalty upon more than one occasion. It was in no respect lessened by the arbitrary rule of the invaders. Accordingly we find James Stanley Goddard, a very noted trader, accompanied by Richard Walker, secretly leaving the town in March, 1776, and taking an active part in assembling a body of Indians to open the communication with the upper posts, which defeated the Americans at the Cedars in May.

It was probably from the knowledge of their determined hostility, and in the hope of conciliating them, that the recently appointed commissioners of Congress in Canada, among whom Benjamin Franklin was the ruling spirit, were then induced to reverse Wooster's policy. Shortly after their arrival in the province they announced that they "had directed the opening of the Indian trade and the granting of passports to all who shall enter into certain engagements to do nothing in the upper country prejudicial to the continental interests."

In a few weeks, however, the problem was solved for them by the entire reconquest of the province by Sir Guy Carleton, and trade resumed its accustomed course.

The fort at Oswegatchie had never been a favourite resort for traders. In May, 1778, detachments from this post and Niagara took possession of Deer or Buck Island at the foot of Lake Ontario. Henceforth it became known as Carleton Island. Hamilton and Cartwright established a trading station there and others followed. The importance of Oswego had steadily waned for years, and in July, 1778, the last remaining trader was driven off by a raiding party from Fort Stanwix. This incident was described in a letter of the 2nd August of that year from Archibald Cunningham, factor at Carleton Island, to Francis Goring.

"L. Parlow was sent by our commandant with a party to bring off his family and effects from Oswego, but on his arrival found that his government had about fourteen days before been burnt by the rebels, who took most of his effects, even the handkerchief from his lady's neck, and his son prisoner, yet he had the good fortune to find they had missed his bag of piasters, two milch cows, his wife and two daughters, with which he made his retreat to this place."

In the autumn of 1778 a military post, which received the name of Fort Haldimand in honour of the governor, was constructed on the upper end of Carleton Island. It was provided with wharves and storehouses and was designed as an *entrepôt* for the supply of all posts on the lakes. Stores of all kinds were brought up in batteaux from Montreal and landed here until they could be reshipped in sailing vessels for Niagara. Its position rendered it tolerably secure from attack, and some of the armed ships on Lake Ontario were usually laid up here for the winter. A quantity of land was brought under cultivation for the supply of the garrison, fruit trees were planted and the place rapidly developed into a trading station of considerable importance.

Trading houses existed for some years, between 1770 and 1780, at Pinewood Creek and Piminiscotyan Landing on the north shore of Lake Ontario, and occasionally a stray trader wintered in the Missassauga villages at Rice Lake and Toronto. A man named Cowan is said to have permanently established himself at Matchedash Bay as early as 1778.

The great difficulties attending the transportation of supplies impelled General Haldimand to attempt the improvement of the navigation of the St. Lawrence by the construction of a series of short canals in the vicinity of Coteau. These works were carried out under the superintend-

ence of Captain Twiss and Lieut. Glenie, of the Royal Engineers, in 1780 and 1781.

Thirty years later, the latter officer referred with pride, in a letter to Lord Bathurst, to his share in the construction of the Coteau canal.

"At Coteau there is a violent rapid where formerly the loaded batteaux in going up the river were obliged to be unloaded and every article had to be carried across a neck of land composed of limestone. I cut a canal through it and erected a storehouse on one side. It was the first canal with locks ever made in Canada."

The volume of trade at Niagara rather increased than diminished in consequence of the war, although the quantity of furs brought in was much less than formerly. There are no statistics available of the amount of merchandise and peltry passing the portage around the falls, but it was undoubtedly large.

A letter from General Schuyler, dated in February 1776, contains the statement that "Mr. Francis Phister, a half-pay lieutenant in the Royal Americans who has bought an estate and resides in this county (Albany), has a contract to supply the carriages on the Niagara Carrying Place, by which, I have been informed, he clears between three and four hundred a year." At the same time Philip Stedman had acquired a monopoly of the right of transporting all goods over this portage.

The traders frequenting the country of the Six Nations took sides in the contest as their inclinations or interests dictated, the great majority however remaining faithful to their allegiance. We hear on the one hand of "Peter Lyckman, an Albany trader," acting as a spy for General Schuyler at Niagara and regularly sending him intelligence, and on the other, that "John Johnson, formerly an Oneida trader," was established by Colonel Butler as his resident agent among the Senecas near Canandaigua Lake, and that despite habits of dissipation he rendered important services.

The official correspondence of successive commandants of Fort Niagara with General Haldimand, and a stray bundle of letters from Francis Goring, furnish occasional glimpses of the mercantile activity of that post.

Colonel Bolton wrote on the 10th of November, 1777:—

"Governor Hamilton writes me that the merchants at Detroit have come to an agreement to build a wharf at Fort Schlosser, and a store at the water's edge 60 x 30, and also another of the same dimensions at the landing place."

December 14th, 1777.—"This place is quite lumbered with merchants' goods, which the badness of the season prevented Mr. Stedman from taking over the landing place."

April 7th, 1778.—"Mr. Pollard, on account of his bad state of health, intends quitting business as a merchant."

May 10th, 1778.—"I have always endeavoured to forward the merchants' goods by rotation, but they are frequently sent here without a single person to take care of them, and you cannot conceive what a plague and trouble I met with last year, every place in this fort was lumbered with their effects and the vessels obliged to navigate the lakes until the 30th of November."

May 12th, 1778.—"I have drawn a bill for £14,769 9s. 5d. in favour of Mr. Pollard for sundries furnished the savages, which Major Butler thought absolutely necessary, notwithstanding all the presents sent to this post last year."

Sept. 8th, 1778.—"Last winter this place was quite lumbered with merchandise; even the officers' barracks was filled with goods, as I would not allow any to remain at the landing during the winter, but ordered the soldiers of the garrison to bring down twenty-six batteau loads. Your Excellency very justly observes that the eagerness of the merchants in forwarding such immense quantities of merchandise may tempt the rebels to draw near this post, and I am astonished that last year, when there were goods to the amount of £50,000 on Deer Island, no attempt was made to destroy them; where they intend to lodge their goods this winter I know not, for it will be absolutely impossible to get half of them over this year on account of the provisions ordered for the upper posts."

Nov. 11th, 1778.—"Major Butler is building barracks on the opposite side of the river, and Captain Matthews is erecting a strong log-house to contain forty or fifty men at the upper landing."

R. Hamilton to F. Goring, 29th June, 1779.—"The general will allow no passes to any of the upper posts. He tells Mr. Matthews that when the commanding officer at Niagara writes for goods he will allow them to go forward."

Bolton to Haldimand, 6th July, 1779.—"The works are going on with all the expedition possible, considering the number of men here and the difficulties we have to encounter bringing home fire-wood, cutting logs, and batteauing provisions up to the landing, etc., at which place, as well as Fort Schlosser and Fort Erie, we have a great quantity of merchants' goods, owing to the large vessels being employed at Detroit this summer."

Goring to R. Hamilton, 14th September, 1779.—"Tobacco is a very scarce article at Detroit, and sells at from eight to ten shillings a pound. I have made out another Indian account for £5,808 17s. 9½d., which is now gone to the Indian country to be certified."

Bolton to Haldimand, 16th September, 1779.—"I have ordered the Haldimand to bring down 48 batteau loads of merchandise from the landing, and have sent orders to the officers at Fort Erie and Schlosser to hold themselves in readiness to join this garrison."

Memorandum on the fur trade, 1780.—"The least stop to sending goods into the Indian country may be prejudicial to the interests of those who trade there. The Indians are so long accustomed to the use of blankets, leggings, and other comforts that they are absolutely necessary to them. The advancement of trade will ever be the first object of attention; unhappily the traders do not consider the preservation of the country necessary to this end, but blindly grasp at all risks, the present means of making fortunes. If the goods they send into that country are disposed of, their sole purpose is accomplished. Under the pretext of the fur trade, an incredible number of persons since the beginning of the rebellion has been required, many more than before, though the Indians being employed in the war necessarily hunt less. The fur trade is not the object, it is the great consumption of rum and Indian presents, manifested by the enormous sums drawn for on those accounts by Government, purchased at a most exorbitant rate from traders."

Goring to Samuel Street, 15th March, 1780.—"Liquors are very scarce here and at Detroit. Lay in as large a stock as our circumstances will allow. Blankets are very scarce; Col. Johnson has sent down orders to buy up all the blankets in Canada. Be sure not to forget to bring something for the belly, as provision is very scarce here. If you could procure two or three cags of corned beef, I believe it will answer. We have experienced the longest and coldest winter ever known here. The river was frozen over from the 7th January to the 1st March, and passable for horses and sleds almost the whole time, which has put us back in our building, the snow being two and three feet deep in the woods; however, the weather has for this week past been milder, in which time we have got all the timber out and only wait for favourable weather to raft it home. Mr. Stedman has promised Col. Johnson all the boards he could cut. The spot is not fixed on as Col. Bolton has not dared to show his nose out this winter."

Bolton to Haldimand, September 14th, 1780.—"You have also, sir, a journal of the party I sent to Lake Huron by way of Toronto."

It is to be regretted that this journal has not been preserved either in the Haldimand collection or among the Colonial Office records.

"Return of batteau loads of merchandise ordered by merchants at Detroit for 1780—90 loads."

Col. Watson Powell to Haldimand, 25th May, 1781.—"The Detroit merchants having no cover for their goods at Fort Erie I desired the engineers to mark out ground for a storehouse there and have given leave to Mr. Garner who came from England last summer, to build one.

Walter Butler to Capt. R. Matthews, 2nd August, 1781.—"The rangers are made drudges of, for Mr. Stedman and others."

Col. H. Dundas to Major R. Matthews, 13th September, 1782.—"Mr. Thompson, a merchant here, has applied to me for leave to send a person to Toronto, opposite this, to trade with the Indians. I told him I could not grant his request until His Excellency's pleasure on that head was known. I must observe that Mr. Thompson is a very modest sort of man and has suffered much from the rebels on the Mohawk river."

Extract from the humble address of farmers residing on the west side of the river Niagara, 1783.—"We have no objection to furnish the garrison at a reasonable price what quantity they may want, fixed by the commanding officer, at the same time we beg leave to sell to the merchants and others at the price we can agree on from being obliged to pay merchants their own price for everything we want."

Haldimand's letters show that he kept a watchful eye upon the conduct of the traders everywhere, and that he was always anxious to promote the true interests of commerce.

In April, 1781, he wrote Capt. Sinclair, lieutenant-governor of Mackinac. —"The season for the departure of the trading canoes bound up the Grand River being arrived, and the traders very solicitous for their passes, I am obliged to gratify their wishes, although I should have been glad to have heard from the Indian countries before they set out, which the backwardness of the season has prevented. I have, however, taken the necessary precaution of laying on them the strictest injunctions of submitting implicitly to such restrictions as from circumstances unknown here and the good of his majesty's service you may see fit to lay them under, and I must earnestly desire that you will pay the utmost attention to the respective destinations of these traders who, I cannot help thinking, under a pretext of exercising the fur trade, abuse the indulgences granted them for that purpose, and do many things injurious to the king's interest and likewise to the reputation of the trade. I am not so well

informed of the complicated circumstances attending that remote trade as I could wish, or as it is necessary I should be. I enclose to you a few hints and memorandums upon that subject, and I request you will with your leisure correct them and suggest to me all such as your long experience and knowledge of that country, and your late observations may have furnished you with, that I may be the better enabled to give that encouragement I wish to so essential a branch of trade, but at the same time carefully avoid giving latitudes, which in the present state of affairs might tend to prejudice what we most want to preserve. So heavily do the traders complain of the losses they have sustained that to content them I have given passes for 100 canoes upon the conditions I have already mentioned to you, that whenever you see the least prospect of danger you will not suffer a single article to be sent."

Again, on the 31st of May, he said: "The Pottowatamies and all other Indians at trading posts may be informed that if they ever again permit the enemy to pillage the traders they may rest assured that a trader will never be permitted to return to them—they being on their hunt or any other evasive argument will not be any more admitted as an excuse. If traders are sent amongst them at their request, it is their duty to protect them, and they must never leave their villages defenceless. If they keep out proper scouts and support that intercourse with each other which the times require, they can never be surprised. Much credit should be given to the Indians towards the Mississippi, who have so faithfully protected their traders."

In August, 1782, the reckless misconduct of some traders caused the adoption of more stringent regulations than ever before.

"As the traders will not conform to regulations established for the last year, recommended by his excellency the governor-general, although their passes oblige them to conform to such regulations, it is not judged necessary to stop trade on account of the obstinacy and demerit of the trader; therefore another scheme is proposed to them to avoid the ruin of the most worthy. Goods will be permitted to go to a certain number of wintering grounds. Proper people will be chosen by the lieutenant-governor for these places. The others must lodge their goods in the fort under a proper person also chosen by the lieutenant-governor, and they will be permitted to take an equal quantity out weekly, giving bond that they will sell none but by retail at the post."

During the same summer a commission composed of Lieut.-Col. Henry Hope, Sir John Johnson, and James Stanley Goddard, was sent to Mackinac to inquire among other things into the condition

of the Indian trade and the state of the military posts on the lakes. They left Montreal on the 21st of August and arrived at their destination on the 15th of September, having been delayed for three days by high winds on Lake Huron. Their course was described by Hope in these terms:—"Up the Grand River (Ottawa) from Canesadago to Matouan (where we quitted it), 117 leagues with 16 portages; up the Little River to the entrance of Lake Nipissing, 18 leagues with 15 portages; across that lake 12 leagues; down the French River, 25 leagues with 3 carrying places, and across Lake Huron to the Island of Machilimakinac 79 leagues; the whole making 251 leagues with 34 carrying places, after which, when I observe to your excellency that the shallowness of the water and rapidity of the current in these rivers are such as to render it absolutely impossible to navigate them in any other craft but bark canoes, it is of course unnecessary almost to add that this communication can serve no other military purpose than to forward expresses to the upper country, or perhaps to throw a very small reinforcement of men into either of the posts of Machilimakinac or Detroit upon emergency, in case of any part of the other by the lakes being intercepted for a time."

He returned by way of Niagara and examined the conditions, terms, and mode of transport across that important carrying place. "On the 11th of October arrived at Carleton Island. I embarked in a batteau next morning and after visiting the post of Oswegatchie and seeing those very ingenious and useful cuts and canals that have been made to facilitate the navigation up these amazing rapids at Coteau du Lac and some other adjacent spots, the current brought me down to Montreal in something more than 48 hours, though a distance of near seventy leagues, and which to ascend with loaded batteaux even in the longest days of the summer season seldom takes less, I am given to understand, than fourteen days and at this time of the year nearer twenty."

The only trader who published a record of his experiences in the country to the north of Lake Superior during this period, that has come to my notice, was J. Long, whose travels appeared in 1791.

After serving seven years as an articled clerk to a Montreal merchant, Long entered the Indian department as an interpreter. In 1777 he left his employment and became a trader in the service of a northwest fur company at a salary of £150 per annum. Leaving Montreal on the 4th of May with two *canoes de maitre*, each manned by ten Canadians, he arrived at Mackinac on the 17th of June. He then proceeded to Sault Ste. Marie and on the 4th of July reached Pays Plat, where his goods were unpacked and made into smaller bales, as it was estimated there were a hundred and eighty carrying places to cross before arriving at

the place where he intended to winter. Twenty Indians were then hired to assist them in passing La Grand Cote de la Roche, the steep and difficult portage at the mouth of the Nipigon. The journey to Lake Alempigon or Nipigon was accomplished with ease. On the first of August he began his march for Sturgeon Lake, accompanied by fifteen Indians, and on the 25th of September arrived at Lac La Mort (Dead Lake), where he proposed to remain during the winter. In January, 1778, he ran short of provisions and was obliged to remove to Lake Manantoye, where Mr. Shaw, a brother trader, was wintering. The severity of the season was so great that James Clark, a trader in the employ of the same company, had five of his men starved to death at Lake Savan. Between Red Lake and Salt Lake, Long states that there were "fourteen portages and twenty-two creeks." From the latter to Cariboo Lake it was eight days' march and there were five creeks and three portages to cross. At this lake a French trader had been settled some years before, but Long found it deserted. The Indians estimated the distance to Lake Schabeechevan (Weed Lake) at ten days march across thirteen portages and the same number of creeks. The trail to Lake Arbitibis passed through three small lakes, and over five portages and eight creeks, and thence to Crow's Nest Lake was a short journey. In April, Long received a letter from one Jacques Sameron, a trader in charge of a party in the service of his employers that had wintered at Lake Schabeechevan, informing him that he intended "to make a *grand coup*," by selling his packs to the Hudson Bay Company and embezzling the proceeds. In the hope of preventing this act of dishonesty, Long made a forced march to Sameron's station only to find on his arrival that the delinquent was several days' march on his way to Hudson Bay. On the 23rd of May he finally abandoned his station at Lac La Mort and returned to Pays Plat with 140 packs of furs.

Remaining there only five days to deliver his furs and receive supplies Long set out on his second expedition, proceeding by the river La Pique, Portage La Rame Nipigon River, Great Crow's Nest Lake and Skunk Lake to Lake Schabeechevan, where he built a house. During the same winter Mr. Fulton established a post at Shekarkestergoan. Joseph La Forme, who led a party to Lac Le Sel, was killed by an Indian, and Long took his men into his own service. In February, 1779, he was visited by a Hudson Bay Company's agent from Fort Albany, which is described as "thirty days' march distant from his station at Lake Schabeechevan, over nineteen portages and creeks, and fourteen rapids." In the spring, Long returned to Mackinac, where he became the adjutant of a militia company formed by the fur traders for the defence of that place.

In that capacity he accompanied the expedition to Prairie du Chien next year.

The formation of the Northwest Fur Company in 1783, marks the beginning of a new era in the Canadian fur trade. The number of "adventurers" engaged in the Northwest trade had by this time been reduced by keen competition, mismanagement, or ill-success to twelve. Among these, the brothers Benjamin and Joseph Frobisher were particularly distinguished by their activity and energy. When the treaty of peace was published and it became probable that the Grand Portage would be found to lie within the United States, they at once began explorations for a new route within British territory, in which they succeeded beyond their expectations. They next took an active part in the organization of a company to include all the traders still concerned in that business. "Being convinced by long experience of the advantages that would arise from a general connection not only calculated to secure and promote their mutual interests but also to guard against any encroachments of the United States on the line of boundary as ceded to them by treaty from Lake Superior to Lake du Bois, they entered upon and concluded articles of agreement under the title of the North-west Company, of which we were named directors, dividing it into sixteen shares, of which each proprietor holds a certain number proportionate to the interest he then had in the country."

With this event the first period of the history of the fur trade naturally terminates.

Navigation of the Great Lakes—1760-1782

Much of the commerce on the lakes continued to be carried on in batteaux or large canoes, although these were being gradually superseded by sailing vessels. The attendant perils of this kind of navigation were not restricted to the danger of shipwreck and drowning. The Annual Register for 1770 records this ghastly tale.

"Letters from Detroit by Monday's New York mail inform us that several boats with goods had been seventy days in crossing Lake Erie, in which time the distress of the people was so great that they had been obliged to keep two human bodies which they found unburied on the shore, in order to collect and kill the ravens and eagles which came to feed on them, for their subsistence. Many other boats have been frozen up within forty miles of Detroit and several traders' small boats with goods had been lost."

On Lake Ontario, even at that date, much of the transportation was done in the "king's ships."

Under date of the 29th of May, 1767, the Register notes, with evident satisfaction, the growth of shipping on that lake.

"There are now four brigs from forty to seventy tons, and sixteen armed deck-cutters on Lake Ontario; by this means the navigation of the great lakes and a mart of trade will soon be established equal to that of the Caspian Sea."

An official return of the 30th of July, 1778, gives a list of all vessels built on the lakes since the year 1759.

ON LAKE ONTARIO.

Scow Mohawk, of 16 guns, built at Niagara in 1759 and 1760, cast away in 1764.

Ship Onedago, of 18 guns, built at Oswego in 1760, cast away in 1764.

Sloop Missassago, of 8 guns, built at Oswego in 1760, cast away in 1765.

Schooner Mercury, of 6 guns, built at Oswego in 1760, laid up and decayed.

Scow Johnston, of 12 guns, built at Oswegatchie, taken from the French in 1760, cast away in 1764.

Schooner ——, of 12 guns, built at Oswegatchie, taken in 1760, cast away in 1761.

Schooner ——, of 6 guns, built at Oswegatchie, taken in 1760, cast away in 1761.

Schooner Brunswick, of 10 guns, built at Oswego in 1765, in service till decayed.

Scow Haldimand, of 18 guns, built at Oswegatchie in 1771, still in service.

Scow Seneca, of 18 guns, built at Oswegatchie in 1777, still in service.

Sloop Charity, of six swivels, built at Niagara in 1770, cast away in 1777.

Sloop Caldwell, of two guns, built at Niagara in 1774, still in service.

ON LAKE ERIE.

Sloop ——, of 8 guns, built at Navy Island in 1763, cast away in 1764.

Schooner Victory, of 6 guns, built at Navy Island in 1763, laid up and burned by accident.

Schooner Boston, of 8 guns, built at Navy Island in 1764, laid up and burned by accident.

Schooner Gladwin, of 8 guns, built at Navy Island in 1764, in service till decayed.

Sloop Charlotte, of 10 guns, built at Navy Island in 1764, in service till decayed.

Schooner Gage, of 16 guns, built at Detroit in 1773, still in service.

Schooner Dunmore, of 12 guns, built at Detroit in 1773, still in service.

Schooner Hope, of 4 swivels, built at Detroit in 1771, still in service.

Sloop Angelica, of 4 swivels, built at Detroit in 1771, still in service.

Sloop Chippawa, of 4 swivels, built at Pine River in 1769, cast away in 1775.

Schooner Faith, of 4 swivels, built at Detroit in 1774, still in service.

Sloop Felicity, built at Detroit in 1775, still in service.

Sloop Adventure, of 4 swivels, built at Detroit in 1776, still in service.

Sloop Wyandot, on the stocks.

Paquet, on the stocks.

Scow Ottawa, on the stocks.

ON LAKE HURON.

Sloop Welcome, built at Machilimakinac in 1777, still in service.

ON LAKE MICHIGAN.

Sloop Archangel, built at Detroit in 1774, still in service.

The manner in which these vessels were employed was described by Col. Bolton in a report of the 10th of May, 1778.

"The scow Haldimand, the scow Seneca, the sloop Caldwell and one more of the same burthen very useful for Lake Ontario. The schooner Gage, the Ottawa (when built) for Lake Erie. The schooner Hope, the schooner Faith, from Fort Schlosser to Fort Erie. The schooner Dunmore for Lake Huron. The sloop Felicity not wanted in the service. The sloop Angelica not worthy of repairs. The sloop Welcome, the property of Mr. John Askin. The sloop Archangel, the property of Messrs. Barth & Son, Lake Michigan, useful by report of Major De Peyster. The Wyandot, packet, burthen 30 tons, when launched to be employed from Detroit to Fort Erie."

A memorandum from Capt. Andrews of the same date requested permission "to enlarge Niagara Navy Hall wharf, there being too little water at the present wharf to careen large vessels at, and it being too small for three vessels to winter at; to build a vessel at Niagara in lieu of the Haldimand, informed that she cannot last above another year, therefore no time should be lost to provide timber; and to erect barracks at Navy Hall for the seamen, a rigging and a sail loft absolutely necessary to fix rigging and make sails in the winter."

The vessel built to replace the Haldimand was the ill-fated schooner Ontario, which foundered with all on board on her first, voyage in October, 1780.

Of this vessel Glenie remarks, "I told Capt. Shank when he was building the Ontario that he was making her too flat-bottomed and that she would overset. Accordingly she overset a few leagues from Niagara, and Col. Bolton and 132 others perished in her."

From another return of the 1st of December, 1782, I extract the following statement of ships then on the lakes.

ON LAKE ONTARIO.

Haldimand, 150 tons, 14 guns, 35 men.

Seneca, 130 tons, 18 guns, 35 men.

Mohawk, 50 tons, 5 guns, 14 men.

Caldwell, 37 tons, 2 guns, 14 men.

Limnade, 220 tons, 16 guns, 45 men.

Four scows.

ON LAKE ERIE.

Gage, 114 tons, 12 guns, 30 men.

Dunmore, 70 tons, 10 guns, 25 men.

Hope, 70 tons, 6 guns, 18 men.

Wyandot, 37 tons, 10 men.

Faith, 37 tons, 10 men.

Angelica, 59 tons, 12 men.

Felicity, 45 tons, 12 men.

Adventure, 18 tons, 8 men.

Welcome, 136 tons, 35 men.

The new vessel Rebecca, 136 tons, 35 men.

A new vessel built at Mackinac.

During this period, and in fact for a full half century, from 1763 until his death at a very advanced age in 1812, the senior officer on Lake Erie was Captain Alexander Grant. According to the authoress of "Letters from the Mountains," he was a younger brother of the house of Glenmoriston in Inverness-shire. In 1792, Grant was appointed a member of the Executive Council of Upper Canada, on which he continued to serve to the end of his life. As president of that body in 1805, he became administrator of the government of the province upon the death of General Hunter.

NOTE ON A MEMORABLE EPOCH IN CANADIAN HISTORY.

BY SANDFORD FLEMING, LL.D., C.M.G., ETC.

(Read 11th February, 1893.)

On the 22nd of July, 1793, a traveller from Montreal reached the shores of what is now the western province of Canada. This traveller was the first civilized man who had traversed the continent between the Atlantic and Pacific oceans in any latitude. In a few months a century will have elapsed since he first looked upon the waters of the Pacific.

On the 20th of July, 1871, seventy-eight years after the consummation of the first transcontinental journey, British Columbia, only a few years emerged from the wilderness, was included in the Canadian Confederation. On that day Canada attained magnificent geographical proportions; the Dominion extended across the entire width of the northern continent. There are not many of our people who are capable of grasping the immensity of this extent or who are impressed with the full value and importance which this acquisition confers on our country. Even the best informed amongst us who contemplate the vast breadth of our possessions can form but imperfect theories of the immeasurable natural wealth it contains, and there are few who would venture to assign a limit to the national prosperity which in the future we may enjoy.

No single division of the British Empire wherever situated, in the Indian seas, in the south of Africa, or in the Australian antipodes, can compare with the Dominion in geographical extent. Of all countries owing allegiance to Queen Victoria no single land can more truly claim the appellation "Greater Britain."

The eve of the completion of a century since the greatest triumph of the famous traveller, Sir Alexander Mackenzie, suggests that we may recall his life and labours, and consider the results which have sprung from his remarkable discoveries or which have been influenced by them.

In 1789 Sir Alexander Mackenzie, then about thirty years of age, discovered the great river which bears his name, and descended its waters to the Arctic Ocean. He thus established the important truth that the northern part of this continent extends unbroken to the Arctic circle. Three years later he undertook his more famous expedition with the

design of penetrating the Rocky Mountains and pursuing his journey in a westerly direction until he found the Pacific. By the discoveries which Mackenzie effected on these expeditions new realms were brought within the influence of the Empire, and the great fact became established that the shores of the vast territory, now the Canadian Dominion, are buffeted by the billows of three oceans—the Atlantic, the Pacific and the Arctic.

The world is familiar with the story of the persevering and heroic efforts to find a north-west passage. We all know that many lives and an enormous amount of treasure have been sacrificed in fruitless attempts to discover a navigable channel in the northern hemisphere, from Europe to Asia. It is not so well remembered, however, that three centuries back the "North-West Passage" was alleged to have been found. I allude to the claim advanced by Juan de Fuca, that he had discovered open water through the continent and that a ship could pass in a given number of days from one ocean to the other. He set forth the character of the discovery claimed by him and described it as extending from the Pacific coast in the latitude of British Columbia on the west to Hudson Strait on the east, and that it was an open waterway generally direct in its course, with a width ranging from 30 to 40 leagues and upwards.

Belief in the alleged discovery among cartographers appears to have been universally entertained. De Fuca promulgated the statement in 1592, and maps published by the French and English Royal geographers in 1752 and 1768 show the defined passage I have described. The whole turned out to be a pure fiction. The first consequence of Mackenzie's travels was to prove irrefragably the non-existence of De Fuca's channel and to sweep away all belief concerning it. The only trace left of the geographical fraud is the name which is still retained by the inlet extending between Vancouver Island and Washington Territory, leading from the Pacific to the Gulf of Georgia. We are unable at the present day to estimate the great influence exercised on geographical science by this disclosure. The facts brought to light by the discoveries of Mackenzie distinctly established beyond all question that the shores of the continent on the Pacific side continue northward until they terminate within the Arctic circle.

An account of Mackenzie's travels was published in 1801. We possess in this volume a detailed narrative of his voyage from Montreal through the continent in 1789, 1793 and intervening years. The maps which accompany the volume present the true position of the lakes and rivers which he discovered ; they likewise show the route he followed through

the mountains of British Columbia to the sea. These publications, the record of years of labour, set at rest the pretensions of De Fuca and demonstrate the absolute impossibility of any practicable passage for ships between the Atlantic and the Pacific through the northern continent; to attain which passage so many futile attempts have been made, and which have occupied so long and so fruitlessly the attention of governments and called forth the enterprising spirit of so many navigators.

On his second voyage, commenced early in 1792, Mackenzie left Montreal and penetrated to Fort Chipewyan on Lake Athabasca, reaching the latter in October the same year. He had started with the design of finding a way through the Rocky Mountain range to the western coast. Whatever difficulties might present themselves he had resolved if at all possible to reach the Pacific Ocean. Without more delay than was necessary in preparing for the journey to the westward, he left Fort Chipewyan and proceeded up Peace River until his progress was impeded by ice. He was then forced to remain winter-bound until the following spring.

On May 9th, 1793, when the river opened, the voyage was resumed. The expedition followed the Peace River to the Forks; one branch is named the Finlay, the other the Parsnip, the latter of which he traced nearly to its source. Arrived at this point, Mackenzie abandoned these waters and proceeded overland, cutting a passage through the woods so that he could carry the canoe. He continued by the trail formed until he reached a stream, the waters of which were flowing in the opposite direction to the current he had left on the eastern slope. This led to a great river called by the Indians of the locality Tacoutche; it is now known as the river Fraser; Mackenzie formed the opinion that it was the upper waters or a branch of the Columbia which river is known to discharge into the Pacific in about latitude forty-six. This was the common belief until 1808, when Simon Fraser descended the Tacoutche to the Gulf of Georgia, proving it to be an entirely independent stream, a discovery held to be so important that the name of Fraser was given to the river and which by common consent it still retains in honour of the man who first followed it to its mouth.

Mackenzie embarked in his canoe, floated down the Tacoutche five days; the party met Indian tribes, with some of whom difficulty was experienced. He learned from the Indians that the river they were descending was of great length and its navigation attended with many perils; his men became discouraged and mutinous; under the circumstances in which he was drifting he determined to abandon the attempt

to descend to the mouth of the supposed Columbia, and resolved to make the effort to reach the sea by a land route. In order to find the Indian trail which he learned would conduct him to the Pacific, the explorer had to turn back and ascend the Tacoutche for some distance. Although depressed at what he held to be a misfortune, this change of route led to the accomplishment of his purpose and enabled him to reach the sea in the space of sixteen days after leaving the main river. Mackenzie again had adventures with the different Indian tribes; he and his men underwent much hardship, and from the state of their provisions were placed on short allowance. The traveller, however, finally attained his long cherished purpose, he reached the shores of the Pacific overland from the Atlantic by a journey through the northern continent of such extent that it must be counted by degrees of longitude. The whole country he traversed is now embraced within the Dominion of Canada.

Every page of Mackenzie's journal shows that his explorations were not effected without constant toil and privation. The discouragements arising from the difficulties and dangers he experienced, and they were incessant, had no influence on his cool determination and dauntless spirit. The many tedious and weary days of physical labour and mental strain, the gloomy and inclement nights to which he was constantly exposed, were not, however, passed in vain; he gained his great reward in the knowledge that he had in the interest of his country attained the object of his long premeditated design; he had penetrated a vast continent for the most part in a condition of wild nature; he had overcome the obstacles imposed by rapid rivers previously unknown, by rugged mountain ranges, by distance, by intervening forests and by extremes of a variable climate. From time to time obstacles presented themselves in the enmity of hostile native tribes, who had never before looked upon the face of a white man, but on the day he arrived at the Pacific coast he had the unqualified satisfaction of feeling that his undertaking had been crowned with complete success. His discoveries settled the dubious point of a practicable north-west passage through the temperate zone; he set at rest forever this long agitated question with the disputes which had arisen regarding it; he added new regions to the realm of British commerce, and in doing so extended the boundaries of geographical science. He did much more, although the full effect of all he had accomplished was unknown to him, we can now, however, attribute to the enterprises to which Mackenzie's discoveries led, that the territory west of the Rocky Mountains became a British province; indeed it is problematical whether in the absence of his discoveries any portion of that country would at present constitute part of the Dominion of Canada.

Many, I think, will agree with me that among the men who have distinguished themselves in the annals of our country there is no name more illustrious than that of Sir Alexander Mackenzie. In my judgment there is no event which we can point to with greater interest and satisfaction than the completion of his perilous enterprise on that day, July 22nd, 1793, when, with his Canadian comrades, he floated in a small canoe on the tide-water of the Pacific.

THE PRESENT ASPECT OF THE OSSIANIC CONTROVERSY.

By Rev. Neil MacNish, B.D., LL.D.

(Read April 1st, 1893.)

James MacPherson was the translator of the poems of Ossian. He might with all fairness have applied the well-known words of Horace to himself, *Exegi monumentum aere perennius:* so wonderful and far-extending was the impression which the poems of Ossian in their English dress speedily made in the literary world, and so firm is the position which, after the lapse of more than a hundred years, those poems occupy in the literary annals of mankind. Professor Blackie thus writes: "On the 2nd day of October, 1759, Dr. Carlyle, of Inveresk, came from the neighbourhood of Dumfries to Moffat and found there John Home, the author of "Douglas," with whom he took up his quarters for the day. In the course of conversation, Home mentioned to Carlyle that he had long been on the scent for some old Gaelic poems which Professor Ferguson, an Atholl man, informed him were current in the Highlands, and that he had at last stumbled upon a person who could give him some definite information on the subject. This was a young man, by name James MacPherson, from the district of Badenoch, in the centre of the Highlands, of good family and well educated, an excellent classical scholar and no stranger to the Muses, and who was at that time acting as tutor to young Graham of Balnagown, afterwards Lord Lynedoch. From this young man Home had learned, that he had in his own possession some of those old poems, which Home eagerly solicited him to translate." MacPherson produced, after much solicitation, an English version of the "Death of Oscar," *Bas Oscair.* The poetical genius which that poem, even in its English dress, displayed, gave immense pleasure to Home and to Dr. Blair, who was then in the zenith of his literary fame. A small volume was subsequently published by MacPherson with the designation, "Fragments of Ancient Poetry collected in the Highlands of Scotland." The public interest in Gaelic poetry at once became deeper and wider, insomuch that the prominent patrons of literature in Scotland, Lord Elibank, Dr. Robertson, Mr. John Home, Sir Adam Ferguson, Dr. Blair and others, determined to send James MacPherson on what they termed a poetical mission throughout the Highlands, for the purpose of collecting all the Ossianic poetry that could be procured, and thus of rescuing from oblivion

poems which could not be otherwise than valuable and entertaining in an eminent degree. MacPherson, accordingly, entered on his labours in 1760 under the most favourable auspices. Wherever he went, in the prosecution of his laudable mission, he received kindly recognition and ready assistance. So successful were his efforts, and so indefatigable was his diligence, that in 1762 he published in one volume his translation of Fingal and sixteen other poems; and that in 1763 he published another volume containing Temora and five other poems. As Dr. Clerk remarks, "The publication of these poems excited the wonder of literary men throughout Europe. They were translated into French, German, and Italian, and speedily ran through various editions. They commanded the admiration of Napoleon, of Goethe, who in his 'Werther' gives 'the Songs of Selma,' and of Schiller, who speaks of the 'great nature of Ossian.'" The Abbé Cesarotti, a professor in the University of Padua, who translated the poems of Ossian into Italian, thus lucidly sets forth the general impression which those poems made. "The appearance of the poems of Ossian was a phenomenon so unexpected and extraordinary, that it is not surprising they should have excited, during even a period of enthusiasm, doubt and astonishment. In a country scarcely known to history, mountainous, difficult of access and almost constantly shaded with mists; in a state of society the most unpolished, wretched and barbarous, without trade, without learning, without arts and sciences, how could such a transcendent genius arise who may be said to dispute the palm with the most celebrated poets of the most civilized nations, and with those even who for so many ages have been considered models of art? This novelty was too much at variance with the generally received opinion, to be implicitly believed without controversy. Was there truly an Ossian? Was he really the author of the poems which have been published under his name? Can this be a spurious work? But when? How? By whom? Those are questions which for a length of time have agitated and divided public opinion in England, while Europe regarded with veneration this surprising phenomenon." Davies, the famous Welsh scholar, after examining the *Claims of Ossian* with critical severity, was led thus to write: "These poems do credit to Caledonia. The Gaelic originals constitute a splendid monument of its language. The Fingal and Temora, upon subjects so interwoven with the feelings of the people, set this corner of the island far above poetic competition, not only with any Celtic tribe, but we may almost say with any nation in Europe."*

There were not wanting those who maintained, that it was impossible

* The Claims of Ossian, p. 326.

for poems such as those that had been ascribed to Ossian, to be handed down during many centuries, mainly by oral tradition. Johnson and Hume and Laing were conspicuous among those who opposed the unambiguous asseverations of MacPherson regarding the poems of Ossian and the manner in which he came to obtain possession of them. Those influential writers went the length of imputing very unworthy motives to MacPherson, and of casting severe aspersions on his literary honesty. In writing to Dr. Blair, Hume makes use of this caustic language: "You need expect no assistance from MacPherson, who flew into a passion when I told him of the letter I had written to you; but you must not mind so strange and heteroclite a mortal, than whom I have scarce ever known a man more perverse and unamiable. He will probably depart for Florida with Governor Johnstone, and I would advise him to travel among the Chickisaws or Cherokees in order to tame him and civilize him." There are not wanting witnesses to attest that the names of Fingal and his heroes were known long before MacPherson published his translation of Ossian. Barbour in his "Bruce," which was published from a MS. that bore the date 1491, makes a distinct reference to Fingal and Goll MacMorni—Gol MakMorn, one of his greatest heroes. In his Gaelic edition of the Psalms of David, which was published in 1684, Kirke makes special mention of Fingal in the author's address to his book. Bishop Carswell of Argyll published in 1567 his Gaelic version of John Knox's Liturgy—the first book that was ever printed in Gaelic In the preface, mention is made of those who are desirous of composing histories concerning warriors and champions, and Fingal the son of Cumhall, with his heroes. Dunbar mentions Fyn MaKowll and Gow MacMorn, *i.e.*, Fionn MacCaomhail and Goll MacMorni. The poems contained in the Dean of Lismore's book were collected by James MacGregor, Dean of Lismore, who died about the year 1551. The book in question is, therefore, more than three hundred years old, and a great portion of it may be assigned to as early a date as 1512. It contains twenty-eight Ossianic poems, extending to two thousand five hundred lines. It thus appears that, apart from the evidence which MacPherson was able to adduce, other writers of a much earlier date place the existence of poems belonging to the age of Ossian beyond a doubt.

It must be difficult for us, with all our modern appliances, to form a correct estimate of the retentiveness, which, under particular cultivation, the human memory is capable of acquiring. We learn, on the authority of Caesar, that the Druids of Britain were in the habit of committing to memory a great number of verses, insomuch that some Druids expended twenty years in completing their education. "They seem," he writes, "to have instituted this method for two reasons: because they would

not have their learning divulged to the vulgar, and lest those who learned by depending on their writings would be less assiduous in cultivating their memory, and because it frequently happens that by the assistance of letters persons take less pains in getting by heart or remembering." Grote informs us that there were educated gentlemen at Athens, who could repeat the Iliad and Odyssey by heart. In the preface to MacCallums' Ossian these very judicious remarks are made: "That until the present century almost every great family in the Highlands had its bard, to whose office it belonged to be master of all the poems of reputation in the country; that among these poems the works of Ossian are easily distinguished from those of later bards by several peculiarities in the style and manner; that Ossian has always been reputed the Homer of the Highlands, and all his compositions held in singular esteem and veneration; and that it was wont to be the great entertainment of the Highlanders to pass the winter evenings in discoursings of the times of Fingal and rehearsing these old poems, of which they had all along been enthusiastically fond." Than Dr. John Smith, the author of the Sean Dana, no one is entitled to greater respect in connection with the Ossianic controversy. He was born in the classical portion of the Highlands of Scotland, and his devotion to Gaelic and Gaelic literature was great and successful. He thus writes: "That there have been in the Highlands of Scotland for some time back a good many poems that were ascribed to Ossian, and repeated by almost all persons and on all occasions, is a fact so indisputable that nobody can be hardy enough to deny it. There is not an old man in the Highlands but will declare, that he heard such poems repeated by his father and grandfather as pieces of the most remote antiquity, long before the translation of them had been thought of. Bards who are themselves several centuries old quote them, imitate them and allude to them. Just now in the parish of Kilninver is a tradesman and poet of the name of MacPhael, whom I have heard for weeks together repeat ancient tales and poems—many of them Ossian's—from five to ten o'clock in the winter nights. In Glendonan, Kilchrenan Parish, is a family of the name of MacDugal; and at Arivean, Glenorchay Parish, another of the name of MacNicol, now almost extinct, both of whom were such senachies for some generations back, that they could entertain at this rate for a whole winter's season. What wonder if the poems of Ossian, where such was the custom, have been so long preserved." Those in our day who are disposed to call the authenticity of the poems of Ossian in question, must find very much to modify their opinion in the citations which I have made—citations which could easily be multiplied, in favour of the extensive prevalence of Ossianic poetry in the Highlands of Scotland during

the last century, and of the consequent facility that MacPherson must have experienced in collecting these poems, which, after he had collated and arranged them, he gave to the world as the poems of Ossian. Dr. Smith had abundant reason on his side when he thus wrote: "Within a century back, the Highlands of Scotland have undergone a greater revolution than for ten centuries before that period." With still greater reason, may we affirm that during the hundred and thirteen years that have elapsed since Dr. Smith published his Gaelic Antiquities, the Highlands of Scotland have undergone a great transformation by extensive emigration from many a strath and glen, so that comparatively imperfect facilities now remain for determining the manner in which Ossianic poems were respected, and preserved, and recited in the past. In a paper which Dr. MacNeill, the author of the Literature of the Highlands, read before the London Gaelic Society a few months ago, he asserts, that shortly after Dr. Clerk's edition of Ossian was published, Campbell, the author of Leabhar na Feinne and of the Popular Tales of the West Highlands, reviewed the work in question so ruthlessly and successfully that all the scaffolding of the authenticity, elaborately erected by Dr. Clerk and others, was laid in ruins. Dr. MacNeill further asserts, that MacPherson's Epics are the clever work of an exceedingly able but irascible Highland genius of the central land of the Gael, by whom they were composed and translated about one hundred and thirty years ago. He contends, without adducing sufficient evidence in favour of his averment, that the prominent Gaelic scholars of our day entertain a similar opinion concerning the poems of Ossian. So patriotic was the spirit which animated Mr. J. F. Campbell, and so enthusiastic was he in connection with the folk-lore and ancient poetry of the Highlands of Scotland, that his memory deserves to be kindly perpetuated. On one side of the monument which the Islay Association, with praiseworthy affection and liberality, erected to commemorate his many excellent qualities, these Gaelic words occur:

Iain og ile
Fior Ghaidheal, sar dhuin' uasal agus ard sgoileir
A choisinn urram agus clu anns gach cearn.
Ged nach do shealbhaich e oighreached aithrichean,
Shealbhaich e gradh nan Ileach,
Agus
Bithidh a chuimhne buan-mhaireann am measg
Chlanna nau Gaidheal.

He was the implacable opponent of MacPherson and Dr. Smith, and his excellent brother Donald Smith. He says "that MacPherson undoubtedly tried to deceive. The two brothers, John and Donald Smith, were

no deceivers, but their ideas as to authenticity differed from modern ideas on that subject." It is apparent, therefore, that Campbell made strong insinuations against the honesty and veracity of MacPherson and John and Donald Smith. A new edition of his Popular Tales of West Highlands was issued during last year. Were a critical examination made of his statements regarding the Ossianic controversy, it would be easy to show, that his views are at times contradictory, and that he could not have had a consistent theory to advance regarding the poems of Ossian. It was to himself that, so late as 1861, trustworthy correspondents sent such information as this from Bembecula and Skye: "A great variety of other poems that go under the name of Ossian's poems are commonly recited by the people. I have frequently questioned old men concerning the Fingalians in almost all parts of the Highlands, from Cape Wrath to the Mull of Cantyre. All had heard of them, and all firmly believed in their existence. Donald Stewart, Skye, 92 years of age, often heard the poems of Ossian. Every person knew them, most could recite them, and all admired them. Another old man had as much Ossianic poetry as would take him whole days in the recital, yet he could recite for whole nights together without the slightest hesitation. A certain schoolmaster affirmed that his father had more Ossianic poetry than all ever MacPherson translated, and that he himself when a boy could repeat what would form a tolerably sized volume. He was personally acquainted with many old men who could repeat lots of Ossianic poetry." Those citations, and citations of a similar kind, which could be made from Campbell's Popular Tales of West Highlands, are of themselves extremely valuable, because they allow us to understand that after the lapse of an entire century since MacPherson went on his poetical mission through the Highlands, Ossianic poetry still survived in the Western Isles, and among Gaels who never heard of MacPherson and who never read a verse of his Ossian. As, therefore, Ossianic poetry was found in large abundance in 1861, the question naturally presents itself: How very extensive must the same poetry have been in 1760. The inference is irresistible, that MacPherson could have found, and doubtless did find, abundance of Ossianic poetry in the Highlands, and that he had no occasion, even if he had the ability, to excogitate, or, in other words, to forge, the poems of Ossian.

That the power of oral tradition is very great, so far as the perpetuation of poetry is concerned, appears very clearly from the remarks which Max Müller makes with regard to the Finns. "The Epic songs still lived among the poorest, recorded by oral tradition alone. From the mouths of the aged, an Epic poem has been collected equalling the Iliad in length and completeness. Kalevala possesses merits not dissimilar

from those of the Iliad, and will claim its place as the fifth national epic of the world."*

Campbell may be regarded as the leader of those who in our day are opposed to the contention, that MacPherson gave to the world a *bona fide* translation of poems which he collected in the Highlands, and which he doubtless corrected and collated before he published them. Campbell's categorical averment is thus expressed by him: "My theory, then, is that about the beginning of the 18th century, or at the end of the 17th century or earlier, Highland bards may have fused floating popular traditions into more complete forms, engrafting their own ideas on what they found, and that MacPherson found these works, translated and altered them, published the translation in 1760, made the Gaelic ready for the press, published some of it in 1763 and made away with the evidence of what he had done when he found that his conduct was blamed. I can see no other way out of the maze of testimony." No unkindness is done to Campbell when it is stated, that his imagination must have acted no insignificant part in leading him to the conclusion which has been cited. It will be of advantage to advert to the evidence which remains with regard to the use that MacPherson made of the material collected by him in the Highlands. Dr. Blair states that "after MacPherson returned to Edinburgh he took lodgings in a house immediately below where Dr. Blair then lived, and that he busied himself in translating from the Gaelic into English." Dr. Blair goes on to say: "I saw him very frequently. He gave me accounts from time to time how he proceeded, and used frequently at dinner to read or repeat to me parts of what he had that day translated. Gentlemen who knew Gaelic looked into his papers and saw some that appeared to them to be old manuscripts."

Mr. Alexander MacAulay, Highland chaplain in Edinburgh at that time, thus writes: "I saw the originals which Mr. MacPherson collected in the Highlands. Mr. Fraser will assure you that he saw them likewise, and was frequently present with Mr. MacPherson when he was translating them, and no man will say that he could impose his own originals upon us, if we had common sense, and a knowledge of our mother tongue. The world may say of him and his translations what they please, but I am convinced for my part that I heard most of these poems repeated since I remember anything at all" The testimony of Mr. Lachlan MacPherson, of Strathmashie, is most valuable: "I assisted MacPherson," he writes, "in collecting the poems of Ossian, and took down from oral tradition and transcribed from old MSS. by far the greater part of

* Science of Language, 1st series; 317, 318.

these pieces he has published. Since the publication, I have carefully compared the translation with the copies of the originals in my hands, and find it amazingly literal, even in such a degree as to preserve in some measure the cadence of the Gaelic versification." It is unnecessary to adduce any other evidence in order to indicate, that MacPherson did in reality translate the poems of Ossian from poetical material that he was successful in obtaining in the Highlands; and that he did not depend, as his modern assailants persist in maintaining on very insufficient grounds, on his own imagination for the thoughts and sentiment which he arrayed in an English attire and to which he was pleased to give the appellation of the Poems of Ossian. Any amount of importance is attached by his modern adversaries to the fact, that MacPherson failed, as they contend, to disclose what his MSS. were, if any, and where he found them. A certain clergyman thus writes: "When MacPherson returned from his tour through the Western Highlands and Islands, he came to my house in Brae-Badenoch . . . He produced several volumes small octavo, or rather large duodecimo, in the Gaelic language and characters, being the poems of Ossian and other ancient bards. Many of these volumes were said to have been collected by Paul MacMhuirich, Bard Chlanraonuil, about the beginning of the 14th century. Mr. Macpherson had these from Clanronald. Clanronald told me that Macpherson had the Gaelic MSS. from him."

The statement of a writer in South-Uist is to the effect, that he saw Neil MacMurrich deliver to Mr. MacPherson a MS. containing the poem Berrathon, with three or four more MSS. Neil MacMurrich and his predecessors for nineteen generations were the bards and historians of Clanronald. The testimony of Malcolm MacPherson is to the effect, that he had a brother who was noted in the country for his knowledge of the poems of Ossian; that when James MacPherson was in the country, he employed himself for four days and four nights at Portree in taking down a variety of poems from his brother, and that the latter gave MacPherson a MS. in quarto and about 1¼ inches in thickness. Captain Morrison states, that he had access in London to Mr. MacPherson's papers, and that he saw many MSS. in the old Gaelic characters containing some of the poems translated, which MSS. they found difficult to read. Lachlin MacVuirich states, that he remembers that his father had a book called the Red Book, which he had from his predecessors, and that Clanronald made his father give up the Red Book to James MacPherson. Professor MacLeod, of Glasgow, assured a friend that he had seen and examined several Gaelic MSS., partly written upon vellum, and apparently of great antiquity, in the possession of Mr. MacPherson, con-

taining portions of poetry mixed with other compositions. MacPherson wrote to a certain clergyman that he had met with a number of old MSS. in his travels, and that he had endeavoured to secure the poetical part of them. He further writes, that he has been lucky enough to lay his hands on a pretty complete poem, and truly epic, concerning Fingal. The testimony of a clergyman who resided in Mull, is to the effect that he was assured by a certain man that the latter in his younger days heard Fingal repeated very frequently in the original, just as Mr. MacPherson has translated it. Is it not apparent now, that, after all, some reliable evidence is available to show, that MacPherson found Gaelic MSS. in the Highlands, and that his modern assailants are by no means justified in dismissing with contemptuous indifference the testimony of reliable men concerning the having in his possession of Gaelic MSS. which he found during his poetical mission through the Highlands? In referring to the intimacy which he had with MacPherson in London, the famous clergyman, Dr. Carlyle, is led to remark, that he was never able to discover in MacPherson's most unguarded moments that he was any other than the collector and translator of the works of Ossian. We have the authority of Dr. Blair for believing, that MacPherson for some months left all the originals of his translations open to inspection and examination in Becket the bookseller's shop, London, and intimated by advertisement in the newspapers that he had done so. Dr. John Smith states, that the Gaelic poems of Ossian lay for a considerable time in the hands of the bookseller for the inspection of all who chose to see them; and, as if this had not been enough, they were offered to the public, had subscribers been found to encourage the undertaking. In his able Essay on the authenticity of the poems of Ossian, Dr. Graham intimates that he saw in the London Magazine for the year 1784 or 1785 an advertisement by Becket, a bookseller in the Strand, certifying that the originals of Ossian had been at his shop for subscription for the space of a whole year, but that the number of subscriptions being inadequate to the expense of publication, the MSS. had been withdrawn. As Blair and Smith and Graham were gentlemen of the highest character, and, therefore, of great veracity, we have every reason to believe that MacPherson placed the Gaelic MS. or MSS. of his Ossian in the shop of the bookseller whose name has been mentioned. If MacPherson forged the poems of Ossian, there is no likelihood whatever, that he would be bold enough to submit his Gaelic MSS. for public inspection. It is somewhat extraordinary, that his modern assailants, who cannot be accused of having an unduly modest opinion of their own acumen, should virtually ignore the fact that MacPherson did submit the Gaelic MSS. of his Ossian to public inspection; and that, consequently, it is *prima facie* absurd to suppose, that he himself

fabricated the poems which he thus exposed to possible if not certain detection, if they were merely his own workmanship.

It is surprising to know, on the authority of Dr. Graham, that corroborative evidence came from an unexpected quarter when the poems of Ossian, in their English attire, began to be extensively read. Captain Parker, who was then residing in Virginia, relates that he was well acquainted with the Rev. Charles Smith, a native of the Island of Mull, who settled near Norfolk in Virginia. A copy of Ossian's poems was sent to Captain Parker, who carried it to Mr. Smith. After a few lines from Temora had been repeated in his hearing, he remarked that he knew that poem, and repeated a great part of it and explained it with an exactness which appeared to Parker to be astonishing and scarcely credible. He acted in a similar manner in connection with several of the other poems. Mr. Smith asserted, that if he had been with Mr. MacPherson, he could have given him some other poems of Ossian well worthy of preservation; that he remembered them almost from infancy; that repeating them was the amusement of the children and servants about his father's house, and generally in all the West Highlands, and that still, walking or riding alone, he was wont to repeat them. Mr. Smith died in 1772, and was about 70 years of age at his death. The indirect testimony of Mr. Smith is very valuable, seeing that he lived far away from the scenes of his youth, and that his references to the customs with which he was familiar in his earlier years go far to strengthen the argument that has weighty evidence on its side, in connection with the extensive prevalence and cultivation of Ossianic poetry in the Highlands. Sir John Sinclair, in his very interesting Dissertation on the authenticity of the poems of Ossian, inserts a somewhat extensive correspondence which he carried on with prominent Ecclesiastics of the Church of Rome respecting a Gaelic manuscript of the poems of Ossian that existed at one time at Douay in Flanders. It appears that a Mr. John Farquharson, when missionary in Strathglass, wrote the MS. about 1745 and brought it to Douay with him, where he was for a time Prefect of Studies. A Mr. MacGillivray, who went to Douay College in 1763, affirmed that after the appearance of MacPherson's translation, the complaint among the Gaelic scholars of that College was, that it failed to do justice to the energy and beauty of the original. Mr. MacGillivray was convinced that this MS. contained all the poems that were published by MacPherson; because Mr. Farquharson remarked frequently in his hearing, after he had read the translation of MacPherson, that he had all these poems in his own collection. The testimony of another Mr. MacGillivray is to the effect, that Mr. Farquharson first saw MacPherson's translation in 1766 or 1767; and that after he had read it, he stated that he had all the translated poems in his

possession. "I have seen him an hundred times," Mr. MacGillivray adds, "turning over his folio, when he read the translation, and comparing it with the Erse, and I can positively say that I saw him in this manner go through the whole poems of Fingal and Temora." The important MS., which was at one time at Douay, was unhappily lost or destroyed amid the military disturbances which subsequently swept over that part of the continent of Europe. An accession of strength, of which too much cannot be made, is imparted by the MS. of Douay to the authenticity of the poems of Ossian, and consequently to the veracity and reliability of MacPherson. Even Mr. Campbell, who, unhappily for his lofty reputation for generosity of heart and mind, is most reluctant to award any praise whatever to MacPherson, is compelled, out of regard, doubtless, to the powerful evidence of the MS. of Douay, to admit that, "unless the statement of Mr. MacGillivray is a deliberate falsehood, there is an end of the argument which makes MacPherson the author, though no early copy of the entire poems is known."

Shortly after the publication of Temora, MacPherson accompanied Governor Johnstone to Florida, and, it is supposed, took with him the Gaelic poems of Ossian to that country. From 1773 until his death in February, 1796, MacPherson's time was much occupied in the discharge of the duties which his position as agent of the Nabob of Arcot imposed upon him. He had in contemplation to print the Gaelic poems of Ossian in Greek rather than in Roman characters. A sum amounting to £1,000 Sterling was collected in India among gentlemen who were natives of the Highlands of Scotland, and who were at that time in the East occupying eminent positions in the service of their country. Sir John MacGregor Murray took a prominent part in raising money among his Gaelic countrymen in India for the purpose of publishing the poems of Ossian in the original language. In the circular which he issued, he said, among other things, that his appeal was to "men who have Gaelic blood in their veins and Gaelic sentiments in their hearts—men who know and feel that elegant as Ossian's modern dress is, it is not equal to his native garb, and that Gaelic, barbarous and uncouth as it is represented, has expressions peculiarly nervous and sublime for every noble and exalted idea that can enlarge and elevate the human mind. The object of this address is to verify the prediction of Ossian that Fingal shall be clothed with fame, a train of light to other times." The munificence of the Gaelic gentlemen in India amounted to something like £1,200 Sterling. They exemplified in an excellent manner the truthfulness of the words of Horace:

Coelum non animum mutant qui trans mare currunt.

To a communication which was addressed to him on behalf of t Highland Society of London, for the purpose of ascertaining when h intended to publish the original poems of Ossian, MacPherson sent th reply:

NORFOLK STREET, July 4th, 1784.

MY DEAR SIR,—I received the favour of your letter dated yesterday, and I am sorry the gentlemen should think of giving themselves the trouble of waiting on me, as a ceremony of that kind is altogether superfluous and unnecessary. I shall adhere to the promise I made several years ago to a deputation of the same kind, that is, to employ my first leisure time, and a considerable portion of time it must be to do it accurately, in arranging and printing the originals of the poems of Ossian as they have come to my hands. Funds having been established for the expense, there can be no excuse but want of leisure for not commencing the work in a very few months.

MacPherson died in 1796, without fulfilling his promise, although twelve years had elapsed since the Gaels in India with generous enthusiasm contributed £1,200 Sterling for publishing the original poems of Ossian. Mr. MacKenzie, Secretary of the Highland Society of London, was appointed as one of his executors by MacPherson, and £1,000 Sterling was bequeathed to him for publishing those poems. Mr. MacKenzie died before he was enabled to complete the work which was committed to him, and to which he applied himself with great faithfulness.

Mr. George MacKenzie was the only executor who chose to serve among those whom Mr. John MacKenzie had appointed. As he could not undertake the publication of the Gaelic poems of Ossian, he transferred the MSS. to the Highland Society of London. A Committee was appointed by that society on the 17th of May, 1804, to superintend the publication of the poems in their original language. The Committee examined the MSS. and found that, although some of the smaller poems were wanting, the principal poems were extant. It was resolved to publish the poems that were already available, and to employ every diligence in order to recover such poems as were missing. The proof-sheets were revised by the Rev. Alexander Stewart, who is favourably known as the author of a Gaelic Grammar. In 1807, nearly half a century after the publication by MacPherson of his translation of Ossian, the poems of Ossian in the original Gaelic were published in three volumes, with a literal translation into Latin, as the title-page sets forth, by the late Robert MacFarlan, A.M., together with a Dissertation on the authenticity of the poems by Sir John Sinclair, Bart., and a translation from the Italian of the Abbé Cesarotti's Dissertation on the controversy respecting the authenticity of Ossian, with notes and a supplementary essay by John MacArthur, LL.D. Sir John Sinclair, who was a scholar of great

refinement, and who had an enthusiastic affection for the poetry of the Scottish Gael, terminates his elaborate Dissertation with the statement of two important propositions which he established:

1. "That the poems of Ossian are authentic ancient poetry.

2. "That in a remote period of our history, the mountains of Scotland produced a bard whose works must render his name immortal, and whose genius has not been surpassed by the efforts of any modern or even ancient competitor." There was published in 1817, another edition of the Gaelic text of the poems of Ossian, under the editorship of the eminent Gaelic scholar, Ewen MacLachlan, of Aberdeen. Another edition of the poems of Ossian in the original Gaelic was published by the Rev. Dr. Archibald Clerk in 1870. That edition contains a literal translation by Dr. Clerk of the poems into English. It has likewise a lucid and exhaustive Dissertation on the anthenticity of the poems. The edition is both able and instructive. It is a singular coincidence that the Earl of Bute of that generation aided MacPherson very liberally, bearing as he did a portion of the expense of publishing Fingal and other poems, and the entire expense of publishing Temora and other poems; while the present Marquis of Bute is entitled to the credit of generously bearing the expense that was incurred by the publication of Dr. Clerk's magnificent edition of the poems of Ossian. There are other important collections of Ossianic poetry. No more honourable name than that of Dr. John Smith is to be found among the Gaelic scholars of his own generation, rich though it was in scholars of learning and critical acumen and patriotic enthusiasm. It was in 1780 that he published his Gaelic Antiquities, a Dissertation on the poems of Ossian and a collection of ancient poetry translated from the Gaelic of Ullin, Ossian, Orran, etc., in other words, an English translation of Gaelic poems which were published by him in 1787, under the designation of Sean Dana. The Sean Dana contain the purest, and in many respects the oldest and best Gaelic in the whole domain of Gaelic literature. Campbell insinuates that the Sean Dana were invented or fabricated by Dr. Smith himself, and that it is vain to look for any traces of them beyond himself. Had Campbell carefully read Dr. Smith's Dissertation, he would have found, that the latter tells in the most ingenuous manner how he was induced to prepare his Sean Dana and from whom he obtained his material. In a foot-note, Dr. Smith gives the names of several persons who aided him by oral recitation, as well as the names of other persons who acted the part of useful and faithful correspondents. "An original collection of the poems of Ossian, Orran, Ullin and other bards who flourished in the same age:" Such is the writing on the title-page of a collection of Ossianic poems, which were collected and edited by

Hugh and John MacCallum, and which were published at Montrose in 1816. A list is appended of the name and residence of the persons from whom the poems that form the collection were received.

In a letter from Ewen MacLachlan, of Aberdeen, which is inserted, these very sensible remarks are made: "If the works of Ossian are a forgery, we have sufficient grounds for believing that the imposition cannot be charged on modern times. Antiquity has ascribed the contents of your work to Ossian, as far as we can rely on the faith of Celtic MSS. and on traditions which we have imbibed with our maternal milk, and whose impressions on our minds will be as permanent as our existence." "The Dean of Lismore's Book, a selection of ancient Gaelic poetry, from a MS. collection made by Sir James MacGregor, Dean of Lismore, in the beginning of the sixteenth century:" Such is the writing on the title-page of a manuscript and a translation of the Dean of Lismore's Book which was published by the Rev. Dr. MacLauchlan, of Edinburgh, in 1862. It contains 2,500 lines of Ossianic poetry, and therefore sets forth a complete refutation of the statement of Johnson who visited the Hebrides in 1773, "that five hundred lines cannot be recovered in the whole Erse language of which there is any evidence that they are a hundred years old." "Leabhar na Feinne: Heroic Gaelic Ballads, collected in Scotland chiefly from 1512 to 1871:" Such is the designation which Mr. J. F. Campbell gave to the collection of Gaelic poetry which he published in 1872. "Reliquiae Celticae:" Such is the name which has been given to Texts, Papers and Studies in Gaelic Literature and Philology by the late Dr. Alexander Cameron. The book in question was published during last year. The editors assert that it may be called a complete corpus of Ossianic poetry. It contains an independent manuscript of the Dean of Lismore's Book. The quantity, therefore, of Ossianic poetry that is still available, is by no means insignificant.

In deference to the many objections which were raised against the genuineness of the poems of Ossian that were given to the world by MacPherson, the Highland Society of Scotland, towards the end of the last century so far as I can ascertain, resolved to submit a series of exhaustive questions to clergymen and others who resided in the Highlands of that country. The object of those questions was to ascertain whether poems similar to those which were collected and published by MacPherson still existed in the Highlands. Minute inquiry was made as to whether the poems published by MacPherson could be identified with poems that were still in circulation. The Report of the Highland Society was published in 1805. Conclusive evidence was adduced to show, that the history of Fingal and his followers, of Ossian and his poems, was commonly known, and that poems

similar to those which were published by MacPherson existed in many parts of the country and could be recited by men who had never heard of MacPherson. The Report terminates with this very decisive language concerning the prevalence of Ossianic poetry. "The Committee can confidently state its opinion, that such poetry did exist; that it was common, general and in great abundance; and that it was of a most impressive and striking sort, in a high degree eloquent, tender and sublime. The Committee is possessed of no documents to show, how much of his collection MacPherson obtained in the form in which he has given it to the world. The poems and fragments of poems which the Committee has been able to procure contain often the substance, and sometimes almost the literal expression—*ipsissima verba*—of passages given by Mr. Macpherson in the poems of which he has published the translations. But the Committee has not been able to obtain any one poem the same in title and tenor with the poems published by him. It is inclined to believe, that he was in use to supply chasms and to give connection by inserting passages which he did not find, and to add what he conceived to be dignity and delicacy to the original composition by striking out passages, by softening incidents, by refining the language—in short, by changing what he considered as too simple or too rude for a modern ear, and elevating what in his opinion was below the standard of good poetry. To what degree, however, he exercised these liberties, it is impossible for the Committee to determine." Nine hundred lines, and when the fragments are included 1,700 lines, of such poetry as that of which MacPherson published a translation, are inserted in the Report that we are now considering, Dr. Clerk is correct in his contention that from the material in their possession, the members of the Committee would be justified in drawing much stronger conclusions than they did in favour of the authenticity of the poems of Ossian. As to the utter lack of ability on the part of MacPherson to invent or forge the poems of Ossian, these citations are sufficient: "Of all the men I ever knew," writes Dr. Blair, "Mr. MacPherson was the most unlikely and unfit to contrive and carry on such an imposture as some people in England ascribed to him. He had none of the versatility, the art and dissimulation which such a character and such an undertaking would have required." Captain Morrison, who was intimately acquainted with MacPherson, writes that so far from composing such poems as were translated, he assisted MacPherson often in understanding some words and suggested some improvements, and that MacPherson could as well compose the prophecies of Isaiah or create the island of Skye as compose a poem like that of Ossian's. The Committee of the Highland Society showed no partiality whatever to MacPherson in the several ingenuous

asseverations which the Report contains regarding the manner that he adopted in all likelihood in arranging his material. It is obvious that, as many versions of the same poem or episode were current, owing to the universal tendency of oral tradition, MacPherson was compelled out of regard to lucidity and continuity of thought and sentiment, to make a judicious rearrangement of the poems or fragments of poems that fell into his hands. Pisistratus, or whoever collected and arranged the poems of Homer, must have followed a similar plan in the arrangement of the Homeric poems that came into his possession. There is, and must be, however, a wide diversity between such an arrangement of poetical matter that was available, and between the excogitation of such poems. Campbell is profuse in his admissions that traditional poems in abundance, written or unwritten and attributed to Ossian, were current in the Highlands and accessible to MacPherson. His grave objection is, that the Gaelic Ossian of 1807 and the Sean Dana of 1787 are almost unknown to the class that recite Gaelic poems which they attribute to Ossian. "The Sean Dana and the Gaelic Ossian are nowhere to be found in any of these collections made from the people." The modern opponents of MacPherson and of the Sean Dana fail, it is very much to be feared, in assigning its due significance to the fact, that almost half a century intervened between the translation of the poems of Ossian by MacPherson and the publication of the Gaelic Ossian—to employ Campbell's own phrase. During so long an interval, much useful poetical material must have been irrecoverably lost.

As a century, with all its changes and transformations in the Highlands of Scotland, intervened between MacPherson's poetical mission through the Highlands and the laudable labour of Campbell in gathering the material of Leabhar na Feinne; no injustice is done to Campbell when it is contended, that he must of necessity have been an imperfect judge of the facilities which MacPherson must have had in preparing the poems of Ossian for publication. And when every deference is made to the frequent allegation of Campbell, that he failed to find Gaelic similar to that of the Gaelic Ossian and the Sean Dana, it surely does not follow that such Gaelic did not exist, unless, indeed, we are to concede that Campbell had accurate knowledge of all the Gaelic that was either spoken or written in Scotland during the long years that passed between 1760 and 1872. It would surely be a violation of all honest criticism to admit, that poems must necessarily have been invented or forged, because, forsooth, an enthusiastic lover of his country's literature did not discover amid all his efforts to disentomb the records of an almost forgotten past, any poetry to correspond exactly in language and sentiment with those poems. Every Gaelic scholar will at once perceive that the Gaelic of

the Sean Dana and of the Gaelic Ossian is far more beautiful and musical than the Gaelic of Leabhar na Feinne; and that, indeed, the classical Gaelic of Scotland is to be found in those two books or collections. It has to be boldly and confidently maintained, that the modern assailants of MacPherson and Dr. Smith must produce much stronger arguments than the airy sentimentality in which they indulge, before they can convince any honest student of the entire controversy regarding Ossianic poetry, that those two men were forgers or literary impostors and nothing more.

It must be granted, in all candour, that were he so disposed, MacPherson could easily have lessened or avoided altogether the severity of the opposition which he had to encounter in connection with the poems of Ossian. It is evident, that he had a remarkable measure of that lofty independence and pride that lives on through every generation in the hearts and minds of the race to which he belonged. Who could blame him for thus reasoning, when Hume and Johnson were levelling the shafts of ridicule and disparagement against him, that, as he was successful in gaining a reputation in the world of letters, perhaps more enviable and more extensive than their own, he could afford, in obedience to the warmth of his Highland pride, to ignore themselves and their persistent abuse? It may be fairly held, that much of the Ossianic poetry which he once possessed, was lost during his sojourn in Florida, and while he was engaged in the discharge of important official functions, which must have occupied very much of his time and attention. Nor is it at all unlikely, that Gaelic poems of much value were mislaid and ultimately lost, during the time that passed between his death and the transmission to the Highland Society of London of all the material that remained.

Very forcible is the opinion of the Abbé Cesarotti: "But whatever may be thought on the subject, the works of the Celtic Homer (Ossian) do exist. They are all of the same brilliant and harmonious colouring, and they have a certain author. Let the author have existed in the times of Caracalla or of St. Patrick; let him be a native of Morven or of Ulster; let him belong to the family of a petty king or to that of a simple Highlander, it is all the same to those who consider him in the light of a poet. Let such as do not like to name him Ossian call him Orpheus. Doubts may be entertained whether Fingal was his father, but no one will say that he was not the son of Apollo." "I confess," says Dr. Blair, "I cannot avoid considering the discovery of the works of Ossian as an important era in the annals of taste and literature, and the share which I have had in contributing towards it as a part of my life by which I have deserved well of this age and posterity."

NIAGARA LIBRARY, 1800–1820.

BY JANET CARNOCHAN.

(Read 6th January, 1894.)

It says much for the members of any community when we find them providing reading of a high literary order, and especially would this be the case, at the beginning of this century, among a band of refugees just emerged from a great struggle, with the forest around them and everything speaking of a new country and all that is implied in this.

When by the merest chance, some months ago, I laid my hands upon an old, brown, leather-covered Record Book, I had no idea of the rich treat it was to prove. To my astonishment, by dint of much patient study of its thick, yellow pages covered with writing, though large yet very difficult to read, it was shown that in this old town of Niagara in those early days there was a most valuable public library well supported, the accounts showing regular payments and much interest, as evidenced by the money contributed and the regular records. To the boast made by Niagarians that here was held the first parliament for Upper Canada, that here was published the first newspaper, that it contains almost the oldest church records in Ontario, must now be added the honour of having had the first public library, and the first agricultural society. The varied information to be gleaned from this book may be thus classified: 1st, a list of proprietors through the years from 1800 to 1820; 2nd, list of their payments and those of non-subscribers; 3rd, catalogue of library with prices of books; 4th, money expended; 5th, rules and regulations; 6th, account of annual meetings, contingent meetings, etc.; 7th, list of books taken out and date of return; 8th, alphabetical list of subscribers with separate page for entries for each during these years. When we think of the vicissitudes of the years 1812, 1813, 1814, and of the stirring events which took place here, military occupation by friend and foe, of fire and sword alternately doing their cruel work, we wonder how this library was preserved, for preserved in part at least it was, for the issue of books goes on, a new catalogue with spaces left perhaps for books missing, and in the accounts sums are paid to replace particular books. It is interesting to follow up the period of the war and in all these divisions note the latest entry, and then following an interval of two years without the break of a line even left as space

between such deeds as the glorious death of the Hero of Upper Canada, the rattle of guns and roar of cannons, the flight over frozen plains, watching the smoking ruins of once happy homes, still go on in the same handwriting, the payment of money, the purchase of books, the annual meetings, etc. It may be doubted if in this day of boasted enlightenment we are willing to pay so much for our reading. One thing at least is certain, against the proprietors of this library cannot be made the charge of light reading now brought so justly against the frequenters of modern libraries. Nothing light or trashy can be found on the list. Theology, history, travel, biography, agriculture, a little poetry, and later, a small amount of fiction. We in these days can almost envy the people of that time for the delight they must have experienced when "Guy Mannering" and "Waverly" appeared, for they knew that the Great Magician of the North was still alive and was sending out regularly those delightful stories, while we can never again hope for such pleasure as the first reading of these books evoked.

In glancing over the list of subscribers we meet with names of many who played no insignificant part—the church, the army, the civil service, the yeomanry, are all represented. We find several names from Fort Niagara, U. S., and also several names of women. Were there nothing in this book but the list of names, this alone would be valuable. It seems strange to think that after all these years we can now take the name of a noted man of those days and follow it up through these pages, tell what style of reading he preferred, when a particular book was taken out, when returned, how he paid his fees, when he attended the meetings of managers, and many other particulars. How little did they think that they were thus providing for us a very interesting page of history now!

The first entry is: "Niagara Library, 8th June, 1800. Sensible how much we are at a loss in this new and remote country for every kind of useful knowledge, and convinced that nothing would be of more use to diffuse knowledge amongst us and our offspring than a library, supported by subscription in this town, we whose names are hereunto subscribed hereby associate ourselves together for that purpose, and promise to pay annually a sum not exceeding four dollars to be laid out on books as agreed upon by a majority of votes at a yearly meeting to be held by us at this town on the 15th August annually, when everything respecting the library will be regulated by the majority of votes.

Andrew Heron.	Wm. Musgrove.	G. Drake.
John Kemp.	Silvester Tiffany.	Wm. Hodgkinson.
John Boyd.	Burgoyne Kemp.	John Jones.
John Young.	John Harrold.	Alex. Stuart.

John McClellan.	John Chisholm.	Peter Ten Brouk.
John Burtch.	John Hardy.	Transferred to J. T. B.
Hugh McLaren.	John Reilley.	J. McFarland.
Wm. Dorman.	Ebenezer Cavers.	John Hill, jr.
Martin McLellan.	Peter Thomson.	Robert Addison.
Thomas Kerr.	John Willson.	Benjamin Pawling.
John Young.	Peter McMicking.	Robert Nelles.
Arch. Thomson.	George Keefer.	Daniel Servos.
Thos. Otway Page.	George Young.	John Decow.
Wm. Drake.	John Smith.	J. Murray.

41 subscribers at 24*s.* each £49 4*s.*, carried to account current page B. 15 August, 1801."

Of the original forty-one the names of only four can now be found in the vicinity, though descendants of several others may be found under other names.

The first on the list, Andrew Heron, was the secretary and treasurer of nearly all the period of twenty years. Robert Addison was the first minister of St. Mark's. Silvester Tiffany was the printer of the "Constellation," which followed the "Upper Canada Gazette." Then follows another list, continued down to 1820, of thirty-four names, making altogether seventy-five, in which we recognize other names.

George Forsyth.	John Powell.	John McNabb.
Robert Kerr.	Robert Weir.	John Robertson.
John Wales.	R. Hamilton.	George Read.
Charles Selick.	Wm. Dickson, A.C.	Robert Mathews.
Colin McNabb.	James Muirhead, A.C.	Dr. West.
Wm. Ward.	Thomas Powis.	J. P. Clement.
T. Butler.	Thomas Butler, A.C.	James Secord.
Wm. McClellan.	Isaac Swayzie.	Wm. Musgrove.
Alex. McKie.	John Symington, A.C.	R. C. Cockrell.
Wm. Mann.	Israel Burtch.	Tubal Parr.
George Havens.	John Ten Brouk.	Ensign Barnard.
John McEwan.	John Silverthorn.	Wm. Claus.

In this list we find the familiar names of Butler, Claus, Dickson, McNabb. That of Swayzie has been made familiar in the name of a delicious russet apple only found in this vicinity and probably first grown on the farm of this patron of our library. Dr. West was from Fort Niagara, and ten names on this list are quite familiar to us yet.

Now follows the account of the first annual meeting held on 15th August, 1800, when it was

"Resolved, that Andrew Heron and Martin McClellan be made commissioners to arrange the business of the society till the annual meeting

to collect the subscriptions and lay it out in books to the best advantage, and that they act by the following rules :

RULE I.

To receive from every subscriber three dollars and no more..

RULE II.

As soon as thirty dollars is collected to lay it out on books, none of which shall be irreligious or immoral.

RULE III.

Every subscriber may, if he chooses, when he pays his subscription, make the choice of a book not exceeding his subscription, which shall be procured for him with all convenient speed, provided nothing irreligious or immoral is contained in the same.

RULE IV.

As soon as a number of books can be procured, not less than fifty volumes, every subscriber shall be entitled to receive any book that remains in the library that he chooses, which he shall return in one month in good order.

RULE V.

No book shall be allowed to any of the subscribers unless they have first paid their subscription."

Here follows a catalogue of books received into the library 2nd March, 1801, No. 1 to 80.

It is remarkable that the first thirty volumes are all of a religious nature, volumes 1, 2 and 3 being Blair's Sermons, and 4 and 5 Walker's Sermons, 9 and 10 Fordyce's Sermons to Young Women ; the names of Watts, Bunyan, Boston, Newton, Doddridge, Wilberforce, Watson, Owen and Willison are seen. An attempt is even made to give proper guidance to young people in an important crisis of life—as No. 28 on the list is Religious Courtship. It is not till we reach No. 34 that we see any history, travel or poetry. This first purchase of eighty volumes, costing £31 17*s*., furnished the young people in these forty homes in poetry only Ossian, Cowper's Task, Campbell's Pleasures of Hope, but they might revel in the Citizen of the World and the Rambler, Bruce's Travels, or Robertson's History of Charles V., and if Religious Courtship pleased them not as No. 28, No. 70 is simply Letters on Courtship. The only work of a less specific gravity is No. 73, The Story Teller, which no doubt was popular with the children of those households. The catalogue goes on during the years, up to 937, and contains many expensive works ; then follows a list of payments for books, and money received for dues, and several pages are then occupied with the account of the annual, always spelled Annuall, meetings. These always took place on the 15th August, and the record goes on without any break, except the year 1813, when the town was in the hands of the Americans.

and 1814, when heaps of ruins replaced happy homes; also 1819 no meeting was held. The question as to how many of the books were preserved and how they were saved is yet to me an unsolved problem. Of course a large number were in circulation in the houses of the town and township; while some would be burnt, others would be saved; but it is certain that a great many of the books in the library were not burnt, as afterwards from the issue of books, from the numbers given as taken out and returned day after day, it may be seen what books were not destroyed. That many were destroyed or lost is certain, as in the accounts for next year the names of many books are given as to replace those lost. There is a new catalogue with spaces left.

To resume the account of meetings.

"Niagara Library Annuall Meeting, No. 2, held this 15th day of August, 1801. Resolved, that in addition to the two trustees who have acted last year two others shall be chosen, to act jointly with them for the year ensuing, and in the next annuall meeting two others shall be chosen to act with these four, and afterwards yearly two fresh ones shall be chosen, and the two oldest shall go out in such a manner as to have always six acting trustees, and at all meetings for transacting business the trustee present who shall be oldest on the list shall take the chair."

Rev. R. Addison and Mr. John Young were the additional trustees this year. "Old members to pay $2, and new members $4." Members who lived out of town were allowed to take two books at once, the time of returning to be extended to six weeks to those in the township, and to those out of the township two months. "Members neglecting to return a book at the proper time to pay a fine of sixpence currency for every week of detention, also if any book be lost, the member to whom it was given shall pay for it at the original cost, if it belongs to a set the whole set to be paid for by the member who lost it, he being entitled to the remaining volumes.

"Resolved, that all members who shall not pay the two dollars above mentioned within six months from this day shall be suspended. Resolved, that every member who shall withdraw from the Society shall have a power of giving his right to any other person approved of by the trustees. Resolved, that the trustees shall meet quarterly, viz., on the second day of every Quarter Sessions of the Peace, and contingent meetings shall be called by the chairman at the request of any two of the trustees."

"Quarterly meeting held at Niagara, 14th October, 1801. Present, Martin McLellan, Rev. R. Addison, Jno. Young. Adjourned till the

next quarterly meeting held at Niagara, 13th January, 1802. Present, Andrew Heron, Martin McLellan, Rev. R. Addison, Jno. Young. Books in catalogue from 118 to 150 received at prices annexed, and that George Young shall make a case for the books, for which he shall be paid a reasonable price." This we find in the accounts to be £5 2*s.*

At the quarterly meeting, April 14th, 1802, "Ordered, that Mr. Tiffany print the laws of the Society, and be allowed three dollars for the same, and deliver not less than seventy copies to the trustees, one to be given to each subscriber, and that Mr. Murray be allowed one dollar more for Robertson's History of Charles V."

At the annual meeting, August 14th, 1802, No 3, "Robt. Kerr, Esq., and Mr. Jno. Hill, trustees added." A stringent law is passed that "that part of the fifth resolution of the second meeting of the Society which directs that every member who shall neglect to return the books shall pay into the hands of some one of the trustees sixpence currency for every week he continues to hold the same after the time limited is expired, be enforced by the librarian, he not being at liberty to let him have another book until that sum is paid, and that that be extended to every person, whether member or not."

New members were this year to pay $5, and next year this was raised to $6. In 1804 comes the first payment to the librarian, and this is certainly a modest allowance. This library seems to have solved the difficulty of keeping down the expenses, as through all these years there is no outlay for firewood, for rent, for light—the allowance to the librarian being a percentage on money paid by what are called non-subscribers. The original members are called sometimes proprietors and sometimes subscribers.

"Resolved, that Andrew Heron be librarian for the ensuing year, and be allowed 12½ per cent. of all the moneys collected for the last twelve months from non-subscribers, and the same for the year to come, and shall be obliged to make good all the books that may be lost by non-subscribers."

This seems very hard on the librarian, but he must have been a book-lover, for through all these years he remained faithful to his trust—the emolument sometimes being £1 7*s.* 6*d.*, sometimes £2 12*s.* 6*d.* For the year 1817 it was only 5*s.* 7*d.*, and the largest amount was £6, which for those days must have been munificent. In 1804, books admitted from 316 to 344, and in January, 1805, quite an addition was made to the library as well as to the members of the society, which item tells us what

we had seen mentioned elsewhere of the existence of an Agricultural Society with a number of valuable books.

"Resolved, that the books mentioned in the catalogue from 348 to 397 be received from the Agricultural Society at the annexed prices, and that in lieu of them the arrears of Robert Kerr, Robert Addison, George Forsyth, Colin McNabb and Robert Hamilton be remitted to them, and that a share in the library be given to Wm. Dickson, James Muirhead, Thomas Butler, John Symington and Joseph Edwards at £2 8*s.* each, all these sums amounting to £16 8*s.*"

In 1805, the trustees are John Kemp, Martin McLellan, John Young, John Waterhouse, Alex. McKie, Wm. Mann, and evidently it is found difficult to enforce the rules, for it is "Resolved, that each and every of the laws and regulations made at the last annual meeting shall continue for the year ensuing the same as they were made." At a contingent meeting, 12th November, 1805, "John McNabb be admitted as member as one of the Agricultural Gentlemen, and Ralph Clench."

At annual meeting, No. 7, August 15th, 1806, Geo. Reid and John Grier, the two new trustees; each proprietor to pay $1 a year; a share, always spelled shear, to be sold at $6.50. "Resolved, that Jacob A. Ball and Lewis Clement be admitted to a share in right of their fathers as members of the Agricultural Society, those gentlemen already having purchased shares, and that Jane Crooks, eldest daughter of the late Francis Crooks, be admitted to a share in right of her father as a member of the Agricultural Society."

Thus history repeats itself. As the daughters of Zelophehad demanded that the inheritance of their father should pass to them, Miss Crooks, over three thousand years afterwards, makes the same claim, and is as successful in obtaining her share of current literature as they in obtaining their share of land. This is not the only woman's name on the list, as we find in 1815 list the name of Miss Hill in place of her father. Also in list of payments the names of Mrs. Sluny, Fort Niagara, N.Y., 6*s.*, Mrs. Stuart, one year, 15*s.*

Members in town were now allowed to take out two books at once, 500 tickets were to be procured with all convenient speed to continue the number to be pasted on each book as entered.

"At annual meeting, No. 8, 1807, shares to be sold at $7.00 each. Resolved, that one hundred copies of the catalogue be printed, and one copy to be given to each proprietor, and also one hundred copies of an abridgment of the laws, if it can be got done on reasonable terms."

"A contingent meeting, 24th Oct., 1807. Present, Alex. McKie, Wm. Mann, Robert Kerr, Jas. Muirhead, Geo. Reid, John Grier. Ralfe

Clench, Esq., offers to take charge of the library on being allowed his proportion of the annual payment. Resolved, that his proposal be accepted if he keep the library open from 10 to 12 o'clock every day, Sundays excepted. Ordered, that Mr. Jas. Turlin's proposal to make a book case, the same as we have, for $12 be accepted." The first book case was £5 2*s*., so that prices must have decreased.

"A contingent meeting, August 1st, 1808. Andrew Heron having prepared a room for the library and offers to perform the duties of librarian, and be answerable for the books that may be missing as usual, Ordered, that his offer be cheerfully accepted. N.B.—Mr. Clench refusing to give up a *kay* to the library, A. Heron will not become responsible for the books that may be missing."

From October, 1807, the entries of books are in an entirely different hand, but Mr. Heron still visited the loved books, for the name frequently occurs, and the next year the entries go on in the same large hand. The little difficulty of the key must have been settled. In the catalogue, books 568 to 611 are entered in a different hand, which is the period of Mr. Clench being in office.

Annual meeting, No. 9, August 15th, 1808. The new trustees are Hon. Robt. Hamilton and Mr. Jno. Symington. Members out of town to be entitled to three books at a time. "Resolved, that Andrew Heron be librarian and treasurer."

Annual meeting, No. 10, August 15th, 1809. Rev. Jno. Burns, minister of St. Andrew's, and John Powell to be the two new trustees, and in place of Hon. R. Hamilton, deceased, John Wagstaff. Shares to be sold at eight dollars. Whether from the liberality of Mr. Heron in providing a room, or from his length of service, or some other reason not known, at this meeting it was "Resolved, that the librarian be entitled to receive 25% of all the money collected from non-subscribers and fines"; the additional title of clerk is now also given, thus, "A. Heron to be librarian, treasurer and clerk."

Annual meeting, No. 11, August 15th, 1810. "Resolved, that attendance on the library be required only one hour, from eleven to twelve on Tuesdays, Thursdays and Saturdays in every week."

Annual meeting, 15th August, 1811. The trustees this year are James Crooks, George Reid, Rev. John Burns, John Powell, James Muirhead and Martin McLellan. Shares are sold at $9—$1 to be paid by each proprietor and $3 by others, or $1 a quarter.

Annual meeting, No. 13, August 15th, 1812. Proprietors to pay $2 each. Books admitted at a contingent meeting 15th November, 1812, shortly after burial of Brock; books admitted, 781 to 827.

The next entry is 15th August, 1815. What a different state of affairs from that of 1812, when war had been declared and Brock was marching to Detroit; or from 1813, when an enemy held the town; or 1814, when the rubbish of bricks was being taken to build Fort Mississagua! But with intrepid courage our trustees meet and make arrangements for the work of the library going on as usual. The trustees were John Symington, George Young, James Crooks, John Burns, George Reid, Andrew Heron. Notwithstanding all the losses incurred by the townspeople, the charges are made somewhat higher, each proprietor to pay $2.50. Shares to be sold at $9, and non-proprietors $4 a year, or $1.50 a quarter, or $1 a month. At a meeting, 22nd January, 1816, books admitted, 882 to 90

Annual meeting, No. 15, August 15th, 1816. "Resolved that John Wray be librarian and clerk."

Quarterly meeting, 9th October, 1816. Books admitted, 901 to 909.

Annual meeting, No. 16, August 15th, 1817. "Resolved, that the meeting being thin that no new trustees shall be chosen, and shall remain to act as last year. Shares to be sold at $10." There seems to have been some difficulty about books circulating too much, as witness the next: "Resolved, that any proprietor or other person who receives books out of the library and allows any person to take them out of his house shall for every offence pay to the librarian £1 currency."

Annual meeting, No. 17, August 15, 1818. "Resolved, that the meeting being thinly attended no new trustees shall be chosen. All regulations remain as last year."

At a meeting of the trustees, held on 1st March, 1820, present John Burns, George Young, James Crooks and And. Heron, "Resolved, that whereas Andrew Heron offered to take charge of the books belonging to the library, that the books shall be transmitted to his house with all convenient speed, and shall there be inspected by Andrew Heron and James Crooks as soon as can be conveniently done."

Here is the record of the last meeting of the trustees of this library. "Whereas the Niagara library has been greatly wasted, first by being plundered by the army of the United States, and has since been greatly neglected, very few of the proprietors having paid their quota to support the same, we, whose names are hereunto subscribed, hereby relinquish our claims on the same to Andrew Heron (who has now opened a library of his own for the use of the public) in consideration of his allowing us the use of his library for three years; this he engages to do to all those who have paid up their yearly contributions to the year 1817 inclusive; to those who have not paid to that period he will allow according to

their deficiency in those payments. We consider those propositions as quite fair, and do thereto assent."

JAS. CROOKS,	JNO. MCEWAN,
J. MUIRHEAD,	J. BUTLER,
JNO. SYMINGTON,	GEO. YOUNG,
JNO. WAGSTAFF,	JNO. GRIER,

JOHN POWELL.

In turning now to the account of money expended and received, it tells something of the love of books in those days that, from the year 1801 to 1818, there was expended on books for this library about £500, the first outlay being £46 17*s.* on August 15th, 1800. The record book itself cost £1, and Mr. Tiffany received for printing £1 4*s.* In reading the rather monotonous account of money paid yearly, monthly, or quarterly, we sometimes meet with a pleasing variety, as books sold by vendue, spelled vandue, fine for detain of books, money to replace a book lost, books and tracts presented, a book of sermons sold to some sermon reader. The list, scattered over many pages, of money expended for books is interesting.

	£	*s.*	*d.*
1801	46	17	0
1802	27	4	6
1803-4	92	10	6
1805	34	8	1
1806	36	8	0
1807	20	19	3
1808-9	20	13	3
1810	31	12	6
1811	43	4	3
1812	21	16	6
1815	24	4	6
1816	15	5	6
1817	43	6	7
1818	17	2	6

SUBSCRIPTIONS PAID.	£	*s.*	*d.*
1801—41 subscribers	49	4	0
1806— 5*s.* from 35 subscribers	8	15	0
1807— 5*s.* " 41 proprietors	10	5	0
1808—10*s.* " 44 "	22	0	0
1809—10*s.* " 42 "	21	0	0
1810—10*s.* " 44 "	22	0	0
1811—10*s.* " 45	21	5	0
1812— 5*s.* " 42	10	10	0
1815—$2 " 25	12	10	0
1816—12*s.* 6*d.* " 13	8	2	6
1817—12*s.* 6*d.* " 15	9	7	6
1818—12*s.* 6*d.* " 8	5	0	0

This sum of £500 does not give all the outlay for books, as many single books are entered alone and not in this way. The modest emolument of the librarian may be seen in the following list, culled from many pages, he receiving a per centage on all sums paid by non-subscribers and fines, the sum varying from 5*s.* 7*d.* one year to £6, but generally less than £2, the whole payment to librarian during these twenty years being £24, so that his must indeed have been a labour of love.

	£	*s.*	£	*s.*	*d.*
In 1804—12½ per cent. on	11		=1	7	6
1805— " " "	11		=1	7	6
1806— " " "	9		=1	2	6

	£	s.	£	s.	d.
In 1807—12½ per cent. on	9		=1	2	6
1808— " " "	6	5=		13	6
1809— " " "	10		=1	5	0
1810—25 " "	9		=2	5	0
1811— " " "	10	10=	2	12	6
1812— " " "	10	10=	2	12	6
1815— " " "	24	0=	6	0	0
1817—12½ " "	2	5=		5	7
1818—25 " "	13	15=	3	8	9

It would be interesting to us to know how so many books were saved. It is known where Mr. Heron lived in the time of the war. The story is told that his wife, with infant, was carried out on the street from a house in the centre of the town. It is likely, as there were forty subscribers and perhaps as many more non-subscribers, and each person might have out three books, there might be two hundred books in circulation, many of which might come back. Then as many articles of furniture were saved, being carried out to the street, many of the books might be saved from the library. The new catalogue gives a list of two hundred with spaces left between. The spaces I at first thought represented books missing, but I have now concluded that the numbers given represent books bought to replace the old ones burnt or lost, as very often the prices are different from the first catalogue, and that the spaces represent books either in the library or if lost not replaced, as in the list of issues of books after the war many numbers occur representing books in these spaces.

It may be worth recording, as forming another link in the history of our library, a strange coincidence which occurred while writing this paper, by which one of the books was heard from. So far I had not met a single person who had even heard of the existence of the library, but calling on an old lady a resident of the town, to inquire about it, a postal card was produced received that day from Ancaster, with this question, "Can you tell me anything of a public library in Niagara when the town was burnt, as I have a book which was the only one saved from the fire." I have since then seen the book. It is number 51 in the catalogue, Blossoms of Morality, or Blossom on Morality, and is remembered by the owner as charred with fire; but these burnt leaves are now torn away, and on an inner page is written, "This book was saved by my father, who was an officer in the British army when the town was burnt, December, 1813. The only book saved from the library. Thomas Taylor." As a matter of fact it is the only book in existence of which we know anything, but it might be worth inquiry if other books can be found belonging to the library, or what became of the library

after it came into the hands of Mr. Heron. We know that he kept a bookstore and published the Gleaner newspaper, bound copies of which for the year 1818 are in homes in the town. Also a copy of Mavor's spelling-book printed by him, with catechism of Church of England at the end, second edition date not plain, but some time after 1800. On another sheet of the record book, headed subscription paper number two, the exact words of the first page of book are copied and the names John Wagstaff, Richard Cockrell, James Hyslop, William Musgrove, Lewis Clement, Wm. Ball, Wm. Forsyth, Wm. Robertson, Alex. Rogers, Andrew Brady, Jas. Patterson, 16th August, 1815: to these are added afterwards A. Heron, T. Symington, P. Ball, W. Hodgkins, T. Jones, J. Muirhead, George Young, W. Burtch, John Robinson, George Reid, Geo. Havens, J. McEwan, Miss Hill. In 1816, names added are, Thos. Butler, Jas. Heron—a sadly diminished list of twenty-seven.

It is intensely interesting to follow all the different divisions of contents through so many years. There was no meeting in 1813, 1814, 1819. Books were taken out up to May 24th, three days before the town was taken. John Dodd paid 5*s*. and Capt. Roxborough 5*s*. There are few records while in possession of U. S. troops, but some money was paid and a few books taken out. "June 18th, 1813, Capt. Dorman, U. S., made a payment, three months, 5*s*." (there is a Wm. Dorman in first list of proprietors). In 1814, March, J. Rea, Ensign, 100th Regt., 10*s*., and the names of John Valentine, 100th Regt., and Jno. Gibson, Field Train Department. Then in 1815, different payments from officers, as Col. Preddy, Col. Harvey, W. E. Athinleck, Hospital Asst. Then Dep. Asst. Com. Gen. Lane, Capt. McQueen, Maj. Montgomery, Major Campbell, Lieut. Vigoreux, Col. St. George, Thos. Cummins, Sergt. 41st Regt., Capt. Claus, Capt. Lyons, Lieut. Vanderventer, Ensign Winder, Capt. Saunders, Capt. Reid, of Fort Niagara, Sergt. Jenkins, Fort Niagara, Dr. West, Fort Niagara, had a share in 1806. Many strange names occur. In the course of my reading the other day occurred the name of Jedediah Prendergast, and singularly enough from the thick, yellow pages of this record stands out conspicuously this identical name, Jedediah Prendergast. But in list of money paid we find Dr. Prendergast, also the names of John Easterbrook, Benj. Wintermute, Louis Dufresne. It is singular that the accounts are kept partly in Halifax currency, partly in York currency, and partly in dollars and cents. In the pages carefully ruled for proprietors, different years, the yearly payment is given as 10*s*. or 5*s*., as the case may be, while in the other list these are entered 16*s*. and 8*s*. In many cases the right of proprietorship is transferred to another. In 1815, several books are bought to replace those missing, such as Spectator, Burns' works, Don Quixote, and in 1816,

Joseph Andrews, Robertson's America, Watt's Improvement, Humphrey Clinker, Children of the Abbey, Josephus, Walker's Sermons, but Porteous' Sermons sold for 10*s.* In 1816, "by amount of books sold at vandue, £27 12*s.* 2*d.*, N.Y. cy., £17 5*s.* 1*d.*" In 1817, "received for damage done to Life of Wellington, 17*s* 6*d.*, Blackstone's commentaries, old copy, paid for being lost, £1 19*s.*" These seem high prices for injury to books. "December 17th, 1804, received from Pte. Nicklon a fine for keeping a book eighteen weeks at 6*d.* sterling, 14*s.* 4*d.*" Poor private, the law said 6*d.* currency, but from his scanty pay he is compelled to disburse this heavy tax.

One entry defeated every effort to decipher it till a happy guess makes it read, "November 12th, 1815. To a Gownd to Mrs. Nulin for taking care of books 15*s.* 6*d.*" Happy Mrs. Nulin, were she fond of reading, for not only might she gratify her inclination, but she also receives a *Gownd* as a reward. There seems in the last years to be a deficit, expressed as balance due A. Heron £11 9*s.* 9*d.* in 1818, showing our treasurer to have been a man of means, as shown also in the record book of St. Andrew's church, of which he was treasurer, when there was a balance due of £176. The last entries are, "By cash received from Mr. Smith for detain of books over the limited time, April 19th, 1819, 7*s.* 6*d.* Aug. 18th, By cash, Mr. Crysler, for detain of books over the limited time, 5*s.*" There are frequent entries of books presented, also tracts. In the catalogue, No. 444 is Abelard and Heloise, presented by Mr. Alexander Cameron, student-at-law. There are altogether 102 names of proprietors, the largest at any time being 45, in 1811, and the smallest eight, in 1818. Among the books in the catalogue are, in poetry, Pope's works, 10 volumes, £2 10*s.*; Shakespeare's, eight volumes, £2 12*s.*; Milton, Johnson, Dryden, Virgil, Thomson, Spenser, Ramsey, Burns, Scott. Fifty volumes on Agriculture, many of them very expensive works, came in 348-398 from Agricultural Society, although in report for 1892 Hon. John Dryden said the first Agricultural Society was formed in 1825.

Hume's History of England, continued by Smollett, 21 volumes, £7 4*s.*; Bruce's Travels, eight volumes, £7 4*s.*, also Cook's and Ansons' Voyages. The library was especially rich in works of travel and in magazines; regularly every year are catalogued, European Magazine, Edinburgh Magazine, Edinburgh Review, Scot's Magazine, Lady's Magazine, British Critic, Annual Register. The British Theatre, 25 volumes, £11, might cause some of our book committees to hesitate in these days, though it staggered not our brave proprietors of those early times. Altogether we think we have much reason to congratulate these pioneers of civilization in this peninsula that such a taste was shown for reading

of such a high order, and express the hope that the libraries of the future may be as well selected, that the public may make as great sacrifices and support as liberally these aids to culture, and that many such secretaries and treasurers may be found willing to give time and faithful service to secure good literature, not only for the present, but to hand down to those to come.

A few words may be pardoned in relation to other libraries in the town. A most interesting and valuable collection of books is to be found in the rectory of St. Mark's church, consisting of about a thousand volumes, with many folio editions quite rare. These were formerly the property of Rev. Robert Addison, sent out by S. P. G. Days—nay, months—might be pleasantly spent in loving examination of these rare editions from Leyden, Oxford, Geneva. Well was it that they were not in any house in town in December, 1813, but being at Lake Lodge (about three miles out in a log house, part of which may yet be seen) they were saved. They were lately in possession of Dr. Stevenson, but by the zeal of the Venerable Archdeacon McMurray they were procured and placed in the rectory. Every book has placed in it this inscription: "Presented to St. Mark's church by the heirs of the Rev. Robert Addison, to be the property of that church in perpetuity." There are altogether fifty-three folio volumes, many of them being specially interesting. One of these, the complete works of George Buchanan, 1715, poems, Latin works, History of Scotland, a Satyr on Laird of Lydington, printed 1570, all in one volume. Hooker's Ecclesiastical Polity, 1598. One folio has been well or rather much used; it is Historical, Geographical and Poetical Dictionary, 1694. No doubt many came, allowed by the kind old man, to consult its pages. On the first leaf, these words show that there were in those days restrictions on the publication of books (these were not removed till the time of William III.): "Whitehall, 28th January, 1691/2. I do allow this work to be printed. Sydney." Jeremy Taylor, Polemical and Moral Discourses, 1657; Burneton, 39 articles, 1700; Machiavelli's Works, 1680; Spottiswood's History of Scotland, 1666; Fuller's Holy State, 1642; Montague's Essays, 1632; Fiddes' Life of Cardinal Wolsey, 1724, with copper plates, one being View of Kitchen of Cardinal's Cottage, Christ Church. Another volume is Historical Collection, Rushworth, 1659, with strange picture of James I., and the awe-inspiring legend "Touch not mine anointed" bringing up thoughts of the length to which this doctrine was carried by that unhappy race. A prayer book, Breeches Bible, 1599, in black letter, and Psalms, version of Sternhold and John Hopkins, all bound together. In the prayer book is the prayer offered "That it may please thee to bless and preserve our Most Gracious

Sovereign Queen Mary, Prince Charles, and the rest of the *Royal Progenie.*" This book has been rebound in vellum.

Other works are Xenophon's Cyrus, 1713; Virgil, 1576; Quintillion, Oxford, 1692; Tillotson, 1675; Poli. Synopsis London (Poole's), 1669; five volumes, folio, Matthew's Commentaries, Plutarch's Morals, 1603; Xenophon's Cyrus, Cicero's works in Latin. A few others at random—Shakespeare, 1771; Spectator, 1726; Jonathan Edwards, 1699; Cicero's Orations, 1590; Lord Clarendon's, 1676; Latin Funeral Orations, 1611; Greek Grammar, 1683; Pope's Iliad, 1721; Erasmus, Rotterdam, 1526; New Testament (French), Geneva, 1577; Pliny's Epistles, 1640; Stillingfleet, 1681; Jeremy Taylor, 1676; Virgil, 1613; Plutarch's Morals, 1603; St. Augustus' City of God, 1610.

Another library, that of St. Andrew's church, singularly enough also numbering about 1,000 volumes as the two already referred to, came into existence Aug. 26th, 1833, and here we see the name of Andrew Heron in the issue of books. There is an index with reference to pages, 214 names, from 1833 to 1869, up to folio 274. Up to 1836 there are 120 names, showing that a large number of families attended St. Andrew's church. There was a catalogue costing 7½*d.* in 1835, and memorandum of copies sold up to 1843. The catalogue numbers 919 books. The only names on the list now attending the church are McFarland, Elliot, Davidson, Blake, Wynn, Carnochan. The first name is, as in Niagara Public Library, Andrew Heron. In 1836 occurs the name of one who afterwards became one of the Fathers of Confederation, Archibald McKellar. He attended the Niagara District Grammar School, was married by Rev. Dr. McGill: there are only two books marked against his name.

Many memories of the past are brought up by the names Barr, Lockhart, Crooks, Stocking, Whitelaw, Eagleson, Wagstaff, Miller, Malcolmson, McMicking. Many books were presented by friends in Scotland, but there are only a few old or rare books. The Harper's Library Series seem to have been well read. It may be recorded as worthy of notice that in the old record book of St. Andrew's church, dating from 1794, many of the names of the supporters are also found in the list of proprietors of the Niagara Library, 1800, showing the love of reading always remarked of the nationality most found in the Presbyterian church.

The successor to these libraries is the Niagara Mechanics' Institute, having been in existence since October 24th, 1848, as a copy of the constitution and by-laws, printed by F. M. Whitelaw, with names of members, one hundred and one, shows; Pres., W. H. Dickson M.P.P.; Vice-President, E. C. Campbell; Secretary, Dr. Melville; Treasurer and Libra-

rian, W. F. G. Downs. Among the committee are Thos. Eedson, John Simpson, Jas. Boulton, J. D. Latouche, B.A., Sam. Risley, Jno. Whitelaw. There is also a catalogue printed by Wm. Kerby in 1861, then numbering about 1,000 volumes. The library has gone through many vicissitudes; being closed for some time, it was greatly revived through the exertions of Dr. Withrow while a resident of Niagara, and has always owed much to the great interest shown in it by Wm. Kirby, F.R.C.S. It now numbers 4,000 volumes and has received much praise for its judicious selection of books.

When we think of the influence in any community of a good library, of the pleasure and profit derived, we think of the words of Ruskin. "We may have in our bookcases the company of the good, the noble, the wise. Here is an *entrée* to the best society. Do you ask to be the companions of nobles, make yourself noble; you must rise to the level of their thoughts, to enter this court with its society, wide as the world, multitudinous as its days; the chosen and the mighty of every place and time, here you may always enter. Into this select company no wealth will bribe, no name overawe; you must fit yourself by labour and merit to understand the thoughts of these great minds. You must love them and become like them." Judge, then, how much the people of this vicinity owe to the proprietors of the Niagara Public Library, furnishing to the young people of so many households reading of so high an order, fitting them to fight manfully the great battle of life.

CATALOGUE OF BOOKS.

Received into Library 2nd March, 1801—1 to 80.

1, 2, 3—Blair's Sermons.
4, 5—Walker's Sermons.
6, 7, 8—Divine Œconomy.
9, 10—Fordyce's Sermons.
11—Newton's Prophecy.
12—Smith's Prophecy.
13—Watt on Son of God.
14— " Improvement of Mind.
15— " Memoirs.
16— " Holy War.
17—Dyer's ———.
18—Willison on the Sabbath.
19—Boston's Character.
20— " Regeneration.
21—Anderson on Psalmody.
22—Cloud of Witnesses.
23—Scott's Essays.
24—Wilberforce's View.
25—Rise and Progress of Religion in the Soul.
26—Watson's Apology for Bible.
27— " " Christianity.
28—Religious Courtship.
29—Owen on Trinity.
30—Brown's Christian Journal.
31—Burton's Feeling.
32—Muirhead's Differentiation.
33—Brown's Oracles.
34—Robertson's History of South America, £1 12s.
35, 36—Robertson's History of South America.
37—Stanton's Embassy to China.
38, 39—Residence in France.

40, 41—Morse's Geography.
42—Bruce's Travels.
43, 44—Citizen of the World.
45, 46—Ossian's Poems.
47—Campbell's Narration.
48, 49—Croker on ———.
50—Caroline Lichfield. (Replaced in 3 vols.)
51—Blossoms of Morality.
52—Pleasures of Hope.
53, 54—Mirror.
55—Mental Improvement.
56—Lady's Library.
57—Cowper's Task.
58-60—Marvellous Magazine.
61—Bennet's Lectures.
62-65—History of Jacobinism, £2.
66, 67—Repository.
68, 69—The Rambler, £1 4s.
70—Letters on Courtship.
71—
73—Story Teller.
74-77—Emperor Charles V.
78—Burk's Revolution.
79—McIntosh's Revolution.
80—A letter to Burk.
81—Communicant's Companion.
82-89—Pope's Works, £2 10s.
90—Milton's Works.
91—Brydon's Tour.
92—Indian Concert.
93, 94—Burnet's Theory of Earth, £2.
95—Robertson's Proofs.
96—Young's Essays.
97-99—Robertson's History of Scotland.
100—History of War in Asia.
101-2—Burk's European Settlement in America.
103—Daniel and Revelation.
104—Gospel Its Own Witness.
105—Duty of Female Sex.
106-17—Rollins' History, £2, 8s.
118-19-20—Edinburgh Magazine, £3 18s.
39—Omitted in its place and carried to page 13, act. current, Boston's Memoirs.
121—Snodgrass' Revelation.
122-24—Gillies' Greece, £2 12s.
125-26—Moore's Letters.
127-28— " Journal.
129-30—Fuller.
131—Ray's Discourses.
132—Taplin's Farriery.
133—Female Complaints.
134-37—Wells' Geography.
138-39-40-41—History of British Admirals, £2.
142-43—Knox on Education.
144—Paradise Regained.
145—World Depths.
146-47—Boderick's Travels.
148—Constitution U. S.
149—Tracts presented by Andrew Heron.
150—History of Barbary.
To—more allowed for History of Charles.
151-52—Beattie's Essays.
153-54—Leland's Life of Philip.
155-56—Bloody Tribunal.
157—Bishop Burnet's History of His Own Times.
158-59—Quintius Curtius' History of Alexander.
160—Mendrill's Journey from Aleppo to Jerusalem.
161—Judah Restored.
162-63—Hervey's Meditation.
164—Goldsmith's Rome.
165—Adam's Views.
166—New Pilgrim.
167—Moral Repository.
168—Colet's Discourses.
169—Theological Magazine.
170-71—N. Y. Missionary.
172—Female Education.
173—Seneca's Morals.
174—Murray's Sequel.
175—English Reader.
176—Zimmerman on Solitude.
177—Fuller's Gospel of the Bible.
178—
179—Mackenzie's Voyage.
180-81—Morse's Gazetteer, £2.
182—Key to the Prophecies.
183—History of Iceland (presented by J. Young.)
184-85—Forbes' Works.

186-206—Hume's History of England, continued by Smollet (21 vols.) £7 4s.
207-212—Heine's History of Scotland, £3 17s.
213-17—Ferguson's History of Rome, £4 7s.
218—Kinneard's Edinburgh.
219—Heates' Pelew Islands.
220—Robertson's India.
221-22—Prideaux Connection.
223-28—Josephus' Works, £2 2s.
229-33—Edinburgh Magazine, £5 12s.
234-36—Edinburgh Review.
237-40—Johnson's Lives.
241-48—Shakespeare's Works, £2 12s.
249-52—Dryden's Virgil.
253-54—Silver Devil.
255-57—Gonsalvo of Cordova.
258—Joseph Andrews.
259-60—Humphrey Clinker.
261-62—Roderick Random.
263—John Bull.
264—Park's Travels.
265-70—British Tourists, £2 17s.
271-72—Heron's Journey.
273-76—Hawkesworth's Voyages.
277-80—Cook's Voyages.
281—Anson's Voyages.
282-83—Leland's Views.
284-86—Blair's Lectures.
287—Erskin's Discourses.
288—Campbell on Miracles.
289—Wall's World to Come.
290-91—Beattie's Evidences.
292—New York Magazine.
293—Fuller.
294—Thompson's Seasons.
294—Spenser's Shepherd.
296—Sherlock on Providence.
297—History of George III.
298-99—Knox's Essays.
300—Commerce of Ancients.
301—Thoughts on State of Religion.
302—Theological Magazine.
303—Memoir's of Gen.—
304—Fletcher's Appeal.
305—M. Magazine.
306—Forsyth on Trees.
307—N. Y. Missionary.
308—Saint's Everlasting Rest.
309—Gospel Sonnets.
310—Rushe's Charges.
311—Russian Empire.
312—Robinson's.
313-14—Talemachus' French and English
315—Aikins' Letters to his Son.
316-18—Adolphus' George III.
319-20—British Critic, £3 5s.
321-23—Edinburgh Review, £1 16s.
324-25—European Magazine, £2 8s.
326-27—Edinburgh " £2 6s.
328-29—Wilson's Egypt, £2 4s.
330-33—Pamela, £2.
334-36—Tom Jones, 18s.
337—Pictures of Palermo.
338—Vicar of Wakefield.
339-42—Burns' Works, £3 15s.
343—Percival's Ceylon, £3 12s.
344—Barrington's N. S. Wales.
345—Nisbet's Church History.
346—State of Europe. (Presented by Hon. R. Hamilton.)
347—Adams' Anecdotes.
348-61—Young's Agriculturist, £10.
362-66—Museum Rusticus, £3 4s.
367-68—Young's Tour in Ireland.
369-74—Wright's Husbandry, £3 12s.
375-76—Marshall's Midland County.
377-78—Adams' Agriculturist.
379-81—Doylin's "
382-83—Dickson's Husbandry.
384—Hart's " "
385-86—Anderson's Agriculturist.
387—Gentleman Farmer.
388-92—Bath Papers.
393-94—Dickson's Agriculturist.
395—Dublin Society.
396—Small & Barrm.
397—Hume on Agriculture.
398-99—Horne on the Psalms.
400-7—Spectator, £3 4s. £5 5s. N. Y. currency is in Canada currency £3 5s. 7½d.
408—Mills on Cattle.
409-10—Pallas' Travels in Russia.
411—Whitman's Travels in Syria.
412-13—Adolphus' History of France.
414— " Reflections.
415-16—Winterbottom's Sierra Leone.

417—Card's Revolutions of Russia.
418—Pinkerton's Geography.
419—Gordon's Rebellion.
420—Population of Ireland.
421—Divernois on the Five Provinces.
422—Grant's Poems.
423-25—Palmerston's Letters.
426—Scot's Magazine, 1804.
427-28—European "
429-33—Edinburgh Review.
434—Sketches at Cape Good Hope.
435—War in St. Domingo.
436—Female Education.
437—Simpson's Plea for Religion.
438—Brown's Sermons.
439—Religion of Greeks.
440—History of Popes.
441—Abelard and Heloise (presented by Mr. Alex. Cameron, Student-at-Law.)
442—Farmer's Boy.
443-44—Marshall's Yorkshire.
445—Tull's Husbandry.
446—Court of St. Cloud.
447—Scot's Edinburgh Magazine.
448-53—Edinburgh Review.
454-57—British Critic, £4 10*s*.
458-65—Bruce's Travels, £7 4*s*.
466-69—Blackstone's Commentaries.
470—Grant's Voyages to N. S. Wales.
471-72—Cyrus' Travels.
473—McHinnem's Tour.
474-79—Plutarch's Lives, £1 13*s*.
480—Peyrmsis' Voyages.
481-89—Witherspoon's Works, £2 8*s*.
490 Sir H. Moncrieff's Sermons.
491—Chatham's Letters.
492 Mallory's Memoirs.
493—Masson's Cookery.
494—Lavater's Physiognomy.
495-98—Don Quixote, £1 18*s*.
499-502-Arabian Nights.
503-05—Edgeworth's Tales.
506-10—Tales of the Castle.
511—4—Peregrine Pickle.
515—Estelie.
516—Devil upon Two Sticks.
517-18—Excessive Sensibility.
519—Man of Feeling.
520-22—Ramsay's Works.
524—Tuckey's Voyages N. S. Wales.
525—Edwards on Baptism.
452-53—European Magazine, omitted.
526-28—Plains.
529-31—History of France.
532—Musical Repository.
533—Speechly on the Vine.
534—Selkirk on Emigration.
535—Fisher's Travels in Spain.
536—Bigland's Modern Europe.
537—Michavois Travels.
538—Scot's Magazine.
539-40—European Magazine.
541—Lady's Magazine.
542-45—Edinburgh Review.
546—Jackson on the Mediterranean.
547—Hinchley's Fall of Venice.
548-49—Repton's Odd Whims.
550-51—Father's Gift.
552-55—Children of the Abbey.
556—Lucas on Duelling.
557—Bravo of Venice.
558-60—Count de Valmont.
560-63—Men and Women.
564— of Seduction.
565-66—Tour of
567—Sermons.
568-79—Henry's History of Great Britain, £6 15*s*.
580-83—Edinburgh Review.
584-85—Scotch Magazine.
586-88—Annals of Great Britain.
589-90—Dick's Selections.
591—Cook on the Resurrection.
592-93—Robertson on Atmosphere.
594-97—Trevanion.
598—History of Masonry.
599-601-Kaines' Sketches.
602-3—Malthus on Population.
604-11—Goldsmith's Animated Nature, £2.
612-14—State of the Times.
615—Scotch Magazine.
616-17—European Magazine.
618—Lady's Magazine.
619-20—British Critic, £2 8*s*.
621-23—Edinburgh Review.
624-26—Smith's Wealth of Nations.

627–29—Ferguson's Lectures.
630–33—Sinclair on Longevity.
634–36—Pickard's West Indies.
637—Public Characters, 1809–10.
638–40—Lounger.
641—Lives of British Naval Heroes.
642—Stewart's Philosophy of Mind.
643–46—Gil Blas.
647–49—Owen on the Spirit.
650–51—Gilpin's Lives of Reformers.
652–59—British Plutarch.
660—Mason on Self-Knowledge.
661—New Picture of Edinburgh.
662—Sterne's Sentimental Journey.
663—Spirit of the English Wits.
664—Saville's Dissertation.
665—Pilgrim's Progress.
666—The Mountain Bard.
667–70—Medical Journal, £3 11*s.*
671–75—Fool of Quality.
676—Chesterfield's.
677—Scotch Magazine, 1809.
678–79—European Magazine.
680—Lady's Magazine.
681–82—British Critic.
683–86—Edinburgh Review.
687 to 711—British Theatre, 25 vols., £11.
712–15—Cutorell's Gazetteer, £5.
716—General Atlas, £2 5*s.*
717–18—Craig's Sermons.
719—Moore's Tales.
720–21—Thornton's Turkey.
722–29—Enfield's Encyclopædia.
730–31—Count Fathom.
732—Vince on Atheism.
733–34—More's Utopia.
735—Cottagers of Glenburnie.
736—Adventures of D———.
737–40— " a Guinea.
741–43—Belinda, £1 2*s.* 6*d.*
744–45—Caroline of ———.
746—
747—Letters from a Loyalist.
748—Hill's Life of Dr. Blair.
749—Life of Buchanan.
750–51—Clarkson on the Slave Trade.
752—Resources of Britain.
753—Scotch Magazine.
754–55—European "
756—Lady's "
757–58—British Critic, £2 8*s.*
759–62—Edinburgh Review.
763–64—Porteous' Sermons.
765—Moorehead's Discourses.
766—Gray's Letters.
767–68—History of Chili.
769—Trotter on Drunkenness.
770–72—Letters from the Mountains.
773— " of Swedish Court.
774—Twin Sisters.
775–82—Clarissa Harlowe, £2 14*s.*
783—Man of the World.
784—Paul and Virginia.
785–86—History of St. Helena.
787–89—Edgeworth's Tales of Fashionable Life, £1 8*s.* 6*d.*
790—History of Charles XII.
791—Scotch Magazine.
792–93—European "
794—Lady's "
795–96—British Critic.
797–800—Edinburgh Review.
801–2—New Annual Register.
803–8—Gifford's Life of Pitt, £6 6*s.*
809–13—Camilla, £1 14*s.*
814—Description of 300 Animals.
815–17—West's Letters to Young Men.
818—Park's Rudiments of Chemistry.
819–20—Tolney's Travels.
821–22—Walker's Sermons.
823—Lady of the Lake.
824—Island of Jamaica.
825–27—Tristram Shandy.
828–35—Edgeworth's Moral Tales.
836–37—British Critic, £2.
838–39—British Critic, 1813, £2.
840–41—Edinburgh Annual Register.
842–43— " " " £2.
844—Scotch Magazine, 1812.
845–47— " " 1813, 1814.
848–49—European Magazine.
850—Lady's "
851–53—Edinburgh Review.
854—British Critic.
855–56—Annual Register, 1811.
857–61—Edinburgh Register.
862–63—Goldsmith's ———.
864–67—Modern Geography.
868—Savage New Zealand.
869–70— Magazine.

871—Castle of Otranto.
872—History of Otaheite.
873-74— " the War.
875-77—Edinburgh Review.
878-79—Gordon's Ireland.
880-81—Edinbugh Register.
882-85—Young Philosopher.
886-87—Peregrine Proteus.
888-90—The Jesuit.
891-95—Scottish Chiefs, £3 4s.
906-8—Waverly.
909—E. Annual Register.
910—Scotch Magazine, 1814.
911-12— " " 1815.
913—Clark's Life of Nelson.
914—Colonial Policy.
915-16—Life of Wellington, £2.
917—European Magazine.
918-20—Scot's Magazine, 1816.
921—Lady's Magazine.
922-27—Edinburgh Review.
928—Annual Register.
929— " " , 1815.
930-31—European Magazine.
932-33—Edinburgh "
934—Lady's Magazine.
935-37—Edinburgh Review.

NOTES ON THE HISTORY OF THE AMALGAMATION PROCESS.

By Robert Dewar.

(Read 27th April, 1893.)

The amalgamation process, although generally believed to be modern, is by no means so, but has really gradually developed through centuries of use to its present position in metallurgical science. We have reasons to believe that the ancient Egyptians were acquainted with this process. Indeed the attraction of mercury for other metals, especially gold and silver, but apparently more especially gold, appears to have been known from the most remote antiquity, and from time immemorial mercury has been used in "streaming for gold," as the process was called. Vitruvius remarks that gold might be recovered from embroidery and old clothes by the use of mercury, and Pliny mentions a process for the gilding of brass and other metals by gold amalgam, remarking that mercury dissolves gold, thus separating it from impurities, and on straining it through leather pure gold is left; to be sure it is really the gold amalgam that is left in the leather. The process called streaming was used to collect the fine gold disseminated through the sand composing the beds of streams or rivers, and consisted in first washing the sand, then triturating the residue with mercury and straining off the superfluous mercury through leather. By miners it was used in a similar manner. The gold ore was first ground and then triturated with mercury in mills; but these mills proved in the long run unsatisfactory as the residuum was found to retain a large quantity of the gold and it was necessary to subject it to a roasting, so that at the commencement of last century they were almost universally abandoned. An opinion prevailed among chemists about this time that unless both the silver and gold existed in the pure state in the substance under treatment by the amalgamation process, then the mercury would fail to dissolve them, and hence the belief, which there was sufficient reason for, that while fire treatment caused the ore to yield the whole of its gold, the amalgamation process did not. This opinion was supported by the most celebrated metallurgists of that period, such as Schlüter, Gellert, Wallerius and Cramer, the result being that the amalgamation process was relegated to that class of processes described as not applicable on the large scale. It may be added that the streaming process was, as used by different nations, exactly the same in procedure as the above.

According to the late Dr. Percy, the first mention of mercury in the metallurgy of silver is made in a treatise by one Biringuccio, an Italian, and published in 1540. The process is performed in a stone or timber basin in which a millstone revolves; the matter to be treated is ground in a mortar, washed and dried, then put into the hollow of above-mentioned basin and ground with the millstone, while being moistened with vinegar or water in which is dissolved corrosive sublimate, verdigris and common salt, the whole being covered with mercury. The millstone is then caused to revolve, stirring the material for two or three hours by hand or horse-power, according to plan adopted. When amalgamation is supposed to be completed the amalgam is separated by a sieve or washing, or passing it through a bag and then retorting or distilling, the gold, silver or copper is obtained. Dr. Percy also states that he (Biringuccio), in a prior description, mentions the use of vitriol and the bag as being made of deerskin leather. This is undoubtedly the result of a long development of the primal process in which merely the mercury was employed, and the earliest treatise extant on the amalgamation process in which "chemicals" (to use an expression common in some branches of the amalgamation process) are mentioned as being used in combination with mercury, thus marking the transition from a mere empirical operation to a scientific process, the result of experimental science. This process was restricted not solely to ores, but applicable to recovering gold or silver from the sweepings of mints, goldbeaters and goldsmiths. Schlüter mentions in his work, published in 1738, that the amalgamation process was used in treating the silver ores of Kongsberg, in Norway, as also the "sweep" of mints and goldsmiths' workshops was treated for recovery of metal by the amalgamation process in Germany when too far removed from smelting works or owing to poverty of stuff. Schlüter, seemingly, does not state how long prior to the appearance of his work the process had been in operation in Norway or Germany; but it is known—at least I find from a metallurgical work in my possession, printed last century—that the process was very unpopular in Europe, and, as I before stated, when Schlüter himself, and Wallerius, Cramer and Gellert thought it not practical on a large scale, it is not strange that Baron Inigo Born met with friction in his successful efforts last century to introduce the amalgamation process into European countries.

The Norwegian process, according to Schlüter, was conducted in mills consisting of a shallow cylinder surmounted by a tub, of which the cylinder is the bottom; the tub is constructed of wood, its inside walls being flush with inner surface of cylinder forming bottom, in the centre of the bottom of pan is a pivot, over which fits a cast iron cross, with arms almost touching side of pan, and being at right angles to one

another; into opposite ends of the cross fit fork-like prongs which are attached to a spindle, at the top of which is a pinion to which a rotatory motion is given by a horizontal crown wheel, as many as eighteen being driven in this manner—the power employed being water—by one crown wheel, although there were also small ones in use which a man could work. The front portion of the tub was pierced by two or three holes, in the same line on different levels, through which the sludge at different periods might be withdrawn from within. The substance was ground, if coarser than sand, and concentrated as much as possible; about two tröge (according to Dr. Percy=to from 40 to 50 lbs.) are thrown into the mill and water added, then 40 lbs. of mercury. Grinding now is started, but should the mill be able to take more it is added with sufficient water to prevent stiffness. Grinding is continued until the whole is brought to a state of mud, when the top plug in the top hole above-mentioned is now removed and the mud allowed to run off to this level, when another charge is added; this is continued until the mercury has absorbed sufficient gold or silver to make it stiff, thus impeding the rotatory motion of the cross, when the tub is emptied of slime and the amalgam taken out, cleaned and dried, and squeezed through a calf-skin bag and distilled; the distilled mercury always retaining a certain quantity of gold or silver, the retort broken and the silver taken out and melted. The amalgamation process as applied to silver had its primal demonstration on a large scale in Mexico, Chili, and Peru. Dr. Percy, in his Metallurgy of Gold and Silver, says that Bartolome Medina was generally admitted to be the inventor of the present "Patio process," having invented it in 1557 while a miner at Pachuca in Mexico; the authority for this statement being two documents, one, a report addressed to the Viceroy of Mexico, by Luis Berria de Montalvo, printed in the city of Mexico in 1643, and the other a memoir by Diaz de La Calle to Philip IV., printed in Madrid, 1646, both giving Medina the honour and credit of the invention. Dr. Percy then adds that this statement is not correct, as Don José Garces y Eguia, says that the first treatise on amalgamation as then conducted was that of Barba, published in Peru, 1639, the process being introduced into Peru by Don Pedro Fernandez de Velasco in 1571. Dr. Percy does not mention when the process was introduced into Mexico, but I have found by consulting the work before mentioned as in my possession, that the process was introduced into Mexico by the same person (Don Pedro de Velasco) five years before his introduction of it into Peru, namely, in 1566. Now, whether the Patio process was ever introduced into Mexico is a point that might be raised. The enormous amount of gold and silver that had been collected and stored by the Caciques that ruled the Aztecs, which was

found on the investiture of Mexico and Peru by the Spaniards, is a thing that is universally known and believed. Now as the Aztecs, or rather the Toltecs, whom the Aztecs subjected, were well advanced in the fine arts, is it too much to imagine that they were considerably advanced in metallurgical science, so far advanced as to enable them to have such a process? or how account for the enormous amount of metal that was in the country, as the present appearance and present existence of free metal in Mexico are not favorable to the theory that these metals were extracted by the Toltecs, and after them the Aztecs, from ore containing the metals in the free state? The objection may be made that for these ancient peoples to have had this process they must have mercury; to this the answer may be made that there are more deposits of mercurial ore in that country than is supposed, and these people would undoubtedly know how to reduce it, as at some of the localities it is found in the native or metallic state reduced by internal heat; but at the best this is merely a suggestion, and the existence of Vannocio Biringuccio's treatise which is identical in its principles with the Patio and published 26 years before the said introduction into America of the process is rather against it, and rather leads to the conclusion that it was long before known in Europe. It is unnecessary for me to describe *in extenso* the Patio process or Gallero process, as it is called in some parts of Mexico, as it has been exhaustively treated of by many metallurgists, among others Alonzo Barba, in his work published in 1639, and during this century by such as Philips and Dr. Percy; indeed, the section of Dr. Percy's work devoted to this process is the most complete extant. I might be allowed to add that there is an indiscriminate use made of the words *Arrastra* and *Tahona* by most authors in describing this process; arrastra is the name used when the motive power is given by mules harnessed to the arm, and tahona is used when the motive power is water—although when in Mexico three years ago I asked the name that was given to the arrastra which was in the Government mint at Guadalajara, and which was driven by steam, and was answered that it was an arrastra.

I might also say I noticed while in Mexico a thing which is not mentioned, at least I have failed to find it in any of the works at my command, and that was the use of men instead of horses in the Patio process. These men that tread the ore are called "Repasedors," and received four reales (4), about fifty cents Canadian or two shillings one penny (2s 1d) British, for every six (6) cargas (equal to (1800) eighteen hundred pounds avoirdupois) of ore which they amalgamated. Their motions are peculiar and indescribable, and require to be seen to be understood; the body is held erect, the right hand grasping a staff, or if a staff is not used to steady, the arms are swung in unison

with the movements of the legs, the legs are raised without bending the knee at an angle from the body, the toes turned out in descending, the heel striking the lamo first, and as the heel touches it the other leg is raised, in this way he proceeds all over his little lamero until it is finished. But notwithstanding all that has been said, there is a loss of the metal contained in the ore as well as the mercury, which is an expensive item; there is no doubt that during last century, especially towards the end, it (the Patio Process) was at its zenith in Mexico as a metallurgical process, which is borne testimony to by a report about that time by one Jose Acosta, who said that in Potosi alone seven thousand (7,000) quintals of mercury were used annually in dressing the ore, not to mention the mercury recovered from the first washing; but it has gradually lost ground since until it has been replaced at innumerable mines by other processes. In Mexico the cauldron or cazo process is one that has been used with much success. Without giving a description of it, it might be said that the apparatus instead of being as now a vessel formed either of blocks of stone or wooden staves like those of a tub, the bottom being a slab of copper 2½ inches in thickness, the metallic bottom retained the same as the head or bottom of a barrel being retained by a groove running round the interior of the vessel, the original cauldron, as invented by Alonzo Barba, was essentially "to be of copper pure, as any alloy present in the copper would involve the mercury taking it into solution; they must be in shape inverted cones and flat bottomed, the under part to have a rim of 6 or 8 inches high and half an inch broad, all beat of one piece; other plates of copper are fixed in the inside by copper nails, it must be water tight, the inside of the boiler to be lined with lime and ox-blood, the upper part surrounded by iron rings, to which is fixed a crossboard carrying at its centre a spindle with wings, which revolves, agitating the contents of the cauldron."

The cazo process or hot amalgamation was accidentally discovered by Alonzo Barba. When trying to fix mercury by boiling silver ore, mercury, and water, mixed in a copper dish, he found that he had a shorter method of amalgamation; he gradually improved on this and introduced it into practice in Peru, in which it was successful in its application to the treatment of chlorides, bromides and iodides of silver which are abundant in that country, and also the ores containing silver in the free state. It was introduced in the sixteenth century and has been in use ever since. There is no change in the process since it was invented, with the exception of the above mentioned replacement of the cauldron entirely made of copper for the one with merely a copper bottom; indeed it was averred by Barba that nothing but a cazo of solid copper would do, but the great corrosion of the copper and the consequent expense

led to the adoption of the present form; with the exception of the above mentioned change the process is identical as first practised.

In 1588 Don Juan De Corduba, a Spaniard, applied to the court of Vienna proposing "to extract silver from its ore whether poor or rich by mercury, and in a short space of time." He made several experiments on a small scale on several kinds of ore which succeeded very well, but on attempting with (20) twenty quintals he failed, and one Lazarus Erker, who was employed to give in a report on the process, disapproved of the method and here it dropped. Baron Inigo Born imputed the failure to his ore not being calcined, his not using salt and the weather being cold. A writer of that period adds to an account of this failure that "Corduba could have remedied the last cause of failure, namely, the cold weather," and I believe he could. The Tintin process as practised in Chili was really a modification of the "streaming for gold" process, and though not generally known was invented by a Franciscan Friar; it was applicable only to ores containing free metal, the apparatus being a stone mortar nine (9") inches deep and 9" wide; the ore being ground along with mercury in it by an iron pestle; the metal contained in the overflow being caught and settled in tanks, afterwards to be treated by the Patio process. This was in use from the sixteenth century in Chili and Peru. The Trapiche and Maray were likewise a modification of the "streaming for gold" process, and some give Barba the credit of having invented them, although I believe he does not claim the honour. The Trapiche is the modern Chilian mill; both have been in use since the sixteenth century.

"The Tina System," or "Sistema de Cooper," as practised in Chili is really a modification of the old abandoned Norwegian process, which I before mentioned, and from about 1825 has been used very extensively and successfully, although only applicable to ores containing free metal. The machinery is greatly improved over the old Norwegian.

Stove amalgamation as practised in Mexico is merely a modification of the Patio, in which the regular process is interrupted in the middle, the ore being conveyed to an estufa or stove, where it is gently heated for two or three days when the Patio process is resumed.

During last century Baron Inigo Du Born succeeded, notwithstanding obstacles thrown in his way, in introducing his amalgamating process at Chemnitz, in Lower Hungary. The process consisted in first stamping the ore dry to a coarse sand (Du Born remarking that "wet stamping would bring on great loss of silver and expensive contrivances to prevent or recover it"). The battery consisted of three stamps to each mortar, the sole or bottom alone being cast iron, each stamp-head weighing

40 to 54 pounds. The stamping is proceeded with, the ore being damped from time to time to prevent loss by ejection; the ore is then passed through brass sieves, and that portion coarser than sand is returned to the stamps. It is then conveyed to a mill, the running stone of which is kept in a box and nothing but the admission funnel being left open. The mill stones were made of porphyry. The ore being ground fine enough was taken to the furnace to be roasted. The furnaces apparently were modified, double-hearthed reverbatories as far as I can gather from the description. When the furnace was at the proper temperature, about 30 quintals was spread evenly over the hearth and the required amount of salt and lime — the amount required being previously determined by assay — was spread over, then the whole turned with crooks and rakes until thoroughly mixed; the process then proceeded as calcination in double-hearth roasting furnaces of to-day. If during the calcination the material clagged, grinding and sifting were again resorted to. The ore was then, if properly calcined, conveyed to the boilers or amalgamators constructed according to the "recommendation" of Alonzo Barba, the stirring apparatus being put in motion by the crank of a water wheel and a horizontal rack with cogs, which being properly fixed in a groove by cross-bars, slid backwards and forwards on brass rollers and casters, the cogs of the rack catching in the perpendicular trundle and spindle of the stirrers which turned round twice by a three and a half ($3\frac{1}{2}$ ft.) foot motion of the sliding rack. The stirrers were circular segments corresponding with the sides and bottom of the boiler. The ore was mixed with sufficient water to make it fluid and the amount of mercury required being gauged from appearance; if the ore was light and voluminous more mercury was required than if it was heavy and compact, the presence of antimony or lead in the ore necessitating an excess of mercury to provide for the neutralizing effect of these metals on the mercury. The residuum or tailings were then washed in tubs provided with stirrers. The amalgam was then freed from excess of mercury by compressing small portions in the hand at a time, as the deerskin was considered too expensive a process. The distillation was then performed "per descensum" in iron pots; the under one standing up to the middle in cold running water, which passed under the hearth, the upper part appearing about two (2″) inches above it. The amalgam made into balls and placed in an iron cullender fixed to an iron tripod was set in the bottom pot, covered on the inside with a coarse cloth. The upper pot was then inverted on the lower one and luted; fire then being put about it the mercury was sublimed and condensed in the bottom pot kept cool by the water; a strong red heat being kept up

for five or six (5 or 6) hours, the cloth is converted into a tinder and afterwards scraped off the cullender by a brass brush.

In 1790 the "Freiberg," or "Barrel process," of amalgamation was introduced at Halsbrücke, near Freiberg, in Germany. The ore contained, beside the silver, antimony, arsenic, copper, lead, iron, and zinc, and sometimes gold, bismuth, nickel and cobalt; in small quantities the silver varied all the way from 15 to 200 ounces per ton, these were mixed to make an average of 75 to 80 ounces per ton; latterly the rich and poor were kept separate, as it was found to be more economical to do so. It was required at least that 25 per cent. of iron pyrites be contained in the ore. If the amount contained in the ore was less than this, addition was made either of pyrites or sulphate of iron, when the pyrites or other sulphides were in excess, the roasting was resorted to to get rid of it, as in the other processes. The ore was roasted in a state of fine division with salt, the oxidation of the pyrites causing the evolution of chlorine and hydrochloric gases, which coming in contact with silver sulphides and other salts of that metal, converts them into chloride; the ore was ultimately amalgamated in revolving barrels; a minute description of this process may be found in any of the standard works on metallurgy. This process was abandoned at Halsbrücke, in 1856, on account of its expensiveness and its unsatisfactory results when applied to certain classes of ore. Over half a century had changed the relationship existing between the prices of labour and fuel; so that it was found to be advantageous to give up the amalgamation process and smelt the ores with others containing lead. This process has also been in use to a certain extent in the United States and also in Mexico. The amalgamation process employed at the Mansfield Copper Works to obtain the silver contained in copper matter was similar to this, but has since been abandoned for Ziervogel's process.

In 1859 the Washoe or Pan process was invented to treat successfully the ores of the great Comstock lode, situated at Virginia City in the Washoe District, State of Nevada. It received the name "Washoe" from its first being introduced in this district. It really owed its invention to the failure of both the Barrel and Patio processes, as both from metallurgical and climatological conditions these processes were unsuited for and proved a failure in the attempts made to apply them to the ore, which contained from $30 to $150 per ton of 2,000 lbs., besides zinc blende, galena, argentite, iron and copper pyrites, and sometimes stephanite and polybasite. The gold occurring to the amount of one-third of the total value of the ore, one portion of the ore only could be treated by the Barrel amalgamation process, and this was that portion

which assayed above $150 per ton; all the rest of the ore below this being treated by the Washoe process. In this process the ore is ground wet in stamp mills; after having been reduced to a suitable size for feeding, the ore passes off in suspension in water through sheet-iron screens and is collected in reservoirs from which it is removed to the pans to be ground with mercury and hot water, with or without the addition of cupric sulphate and common salt—the amount of this used varying in different works but generally consisting of from one to three pounds—to each charge of ore which consists in the old pans—those of Varney, Wheeler, Hepburn and Peterson—of 1,200 to 15,000 lbs. of ore, but in the later and larger pans—those, for instance of McCone and Mountain —the charge is 4,000 to 5,000 lbs. The description of this process and the machinery employed in it have been so voluminously treated of that it would be superfluous for me to again describe it. Suffice it to say that the benefit of the "chemicals" is doubted by some and the real action of them is not understood. As far as the conducting of the live steam into the pulp is concerned, either loose or in the shallow chamber, it appears to me that its principal effect and value is that it keeps to a certain extent the mercury from flouring. The Boss continuous process, patented by Mr. Boss of United States, is a modification of this process, in which a series of pans are employed, into which the pulp passes, instead of it passing directly into the separators.

Although amalgamation of gold ores was effected in the streaming mills, arrastras and Chilian mills for centuries, it was not until this century that amalgamation was effected in the batteries of stamp mills, and at the present time the greatest portion of the gold ores are treated in this way, amalgamation being effected by the mercury added and the amalgamated copper plates fixed to the inside of the mortar boxes or caught on the amalgamated apron riffles of the sluices. A great many contrivances have been invented for the tailings besides the amalgamated rifles; blankets, sluices were used, and also various jiggers, buddles, vanners, etc., for concentrating these tailings, which are afterwards treated in such machines as the Attwood amalgamator, the Eureka rubber pans, the Hungarian mill (which was used at Chemnitz and other localities), and various other inventions. Stamps themselves date far back as grinding mills, though not so as amalgamators. Various mills of late years have been invented as direct amalgamators, notable among which is the Crawford mill. This mill consists of a pan or basin of cast iron supported on four iron uprights, which are attached at the bottom to a circular iron frame which forms the base. The bottom of the pan or basin is elevated at its centre and gradually slopes to the sides; a little over half-way to the sides the bottom suddenly is depressed,

thus forming an annular groove round the outer edge of the bottom of the basin. Through the centre of the bottom of the pan or basin, where there is an opening, a short upright piece of shafting passes, which fits at the bottom into a journal in the centre of the base. After passing through the opening in the bottom of pan, it is attached at its top extremity to a false bottom, which fits upon the true bottom, almost completely covering the above-mentioned groove, leaving only a small space open communicating with the upper part. The sides of this false bottom, as also the sides of the pan at the same level, have steel castings attached to them. On the area formed by the steel castings, which form also a groove which forms a half circle and a complete ring round the pan, balls of iron are placed which revolve when the false bottom, which is attached to the upright shaft, is set in motion by gearing attached to the shaft between the bottom of pan and base of stand; over the pan is bolted a dome, which at its apex continues perpendicular to form a pipe, round which near its top is a circular stage with a spout; inside this "pipe" fits a second, whose mouth is expanded to a filler; the bottom extends down further than the commencement of the apex of the dome to almost the level of the tops of the balls; this acts as the hopper through which the ore is fed. To the bottom, at one side of the first-mentioned annular groove, is attached a mercury pipe, through which the mercury is fed to the mill; a water pipe enters at that part of the centre of the bottom where the upright shaft, bearing the gearing for driving, enters; an oil supply pipe also supplies oil to the bearing of the shaft as it enters the bottom of pan.

The ore is fed by the hopper and is ground by the circular motion of bottom and balls to one hundred to two hundred (100 to 200) mesh. The first-mentioned annular groove, is filled with mercury, into which the finely divided gold gravitates through the water; the matrix and other minerals being finely divided and having a less specific gravity than gold are forced up and carried off by the water, the water passing off by the opening formed by the pipe of the hopper and the continuation pipe of the dome, it rises through this space, falls over on the circular stage and flows away by the spout; the water enters with a considerable upward pressure, which keeps everything but the gold from reaching the mercury, this pressure is exhausted by the lateral sweep of the balls and expansion in the wide dome. The mill is claimed to be able to treat any and every ore of gold, arsenical, pyritical, antimonial or the most refractory ore and save over (90%) ninety per cent., requiring less power than "stamps," and one-fourth (¼) less water, and one very good thing about it, I think, is that the tube by which the amalgam is drawn off is securely

padlocked, thus preventing the stealing of amalgam, which, as we are all too well aware, has been practised too often in the past.

Thus the amalgamation process stands to-day the result of development from the old "streaming for gold" mill to the stamp mills, and mills of Crawford type; from the process of Vanoccio Biringuccio to the Patio, Barrel or Freiberg, and Pan or Washoe process. The use of chemicals seems to have received a fair share of consideration, although we are a little startled by the statement made in an anonymous Latin account of amalgamation similar to the Patio in which ground horns, bricks, and sulphur are added to the usual complement of chemicals, and said to have been practised in Guatemala by the writer; the sulphur astonishes us when we know the dire results of its coming in contact with either the gold or mercury in the amalgamation process. The applications in November, 1864, by Dr. Wurtz, of New York, and in February, 1865, by Mr. Crookes, F.R.S., of London, for the patent for the use of sodium amalgam in the amalgamation process, Wurtz for America, and Crookes for Britain, revealed the fact that both had been experimenting on the same principle for the benefit of science without the knowledge of the other. This is at least one point of general interest in the amalgamation process; but although extensively tried both in California and Australia, the results obtained differed greatly, and it was not used as much as had been expected, although up to the present it has its partisans, and to a certain extent, it had a beneficial influence. I have noticed that mill men prefer mercury that has been formerly used which is known to contain gold or silver amalgam, as it is supposed to be more effective in absorbing the metals than the clean mercury. The amalgamation process, according to some, has reached its zenith; whether this is so or not is hard to say, whether more brilliant inventions and discoveries will be made in the application of the amalgamation process remains to be seen. Time alone will tell. One thing is apparent to all, namely, that other chemical processes are gradually gaining ground and recognition, although our dear old friend is holding the ground bravely, and it may be said in conclusion that it can look back at its past and honorable history, as a nobleman looks back over his long line of descent, and may treat with scorn the upstart claimants of a day for the honorable position of the Amalgamation Process in Metallurgy.

NOTE.—A number of attempts have been made to apply electricity in the amalgamation process by means of sending electric currents through amalgamated rifles, terraces and aprons; noticeable among others was the machine invented by one Charles M. Dobson in 1887, in Toronto,

considerable notice of which was taken and a full description given by the journals of that date. The electricity was applied in this machine by means of a carbon shod diaphragm, which moved backwards or forwards over the surface of amalgamated copper plates, the electricity being supplied by a small dynamo. The advantages claimed for this invention were that the electricity as conducted by the carbon shoes kept the surface of the mercury clean and bright, volatilizing any sulphur or arsenic which came in contact with it and agitating any other metallic constituent present, thus keeping them from coming in contact with the mercury and allowing the gold and silver the full benefit of the pure mercury. No further comment is required on this subject, further than that these inventions enjoyed existence for a very short time.

TRANSACTIONS

OF

The Canadian Institute.

VOLUME V.

TORONTO:

PRINTED FOR THE CANADIAN INSTITUTE

BY MURRAY PRINTING COMPANY.

1898.

ERRATA.

Page 109, lines 9 and 32, for "1896" read "1886."
Page 110, line 3, for "1896" read "1886."
Page 110, line 28, for "1895" read "1885."
Page 112, line 28, dele "below zero."
Page 268, line 19, for "latter" read "former."
Page 268, line 29, for "*phlegmaria*" read "*Phlegmaria.*"
Page 274, foot-note, for "Rhabenhorst" read "Rabenhorst."
Page 276, line 17, for "*phlegmaria*" read "*Phlegmaria.*"
Page 290, line 3, for "hypobasal" read "epibasal."
Page 359, line 4, for "Ph.B." read "Ph.D."

OFFICERS

OF

THE CANADIAN INSTITUTE,

1897-1898.

President:
A. B. MACALLUM, PH.D., M.B.

1st Vice-President:	2nd Vice-President:
B. E. WALKER, ESQ.	DANIEL CLARK, M.D.

Secretary,	EDWARD C. JEFFREY, B.A.
Treasurer,	JAMES BAIN, JR., ESQ.
Librarian,	JOHN SQUAIR, M.A.
Curator,	G. G. PURSEY, ESQ.
Editor,	GEORGE KENNEDY, M.A., LL.D.

Members of Council:

A. P. COLEMAN, PH.D.
R. F. STUPART, ESQ.
R. RAMSAY WRIGHT, M.A.
ARTHUR HARVEY, ESQ.
JOHN MAUGHAN, ESQ., *Chairman Biological Section.*
J. C. HAMILTON, LL.B.

Assistant Secretary and Librarian:
MARGARET J. LOGAN.

CONTENTS.

PAGE.

Officers, 1897-98 iii

Three Carrier Myths 1
REV. FATHER MORICE, O.M.I.

The Fluctuations of Lake Ontario 37
KIVAS TULLY, C.E.

The Gesture Language of the Blackfeet 44
REV. JOHN MACLEAN, PH.D.

The Climate of Alberta 49
R. F. STUPART.

Aboriginal American Inscriptions in Phonetic Characters 53
JOHN CAMPBELL, LL.D., F.R.S.C., ETC.

Wales and its Literature 64
NEIL MACNISH, B.D., LL.D.

The Fur Trade, 1783-7 74
CAPT. E. CRUIKSHANK.

A Review of Carvalyn Gailckagh or Manx Carols 83
NEIL MACNISH, B.D., LL.D.

The Celt in Ancient Egypt and Babylonia 89
JOHN CAMPBELL, LL.D.

The Seasons, Hudson's Strait 104
F. F. PAYNE.

Picture-Writing of the Blackfeet 114
REV. JOHN MACLEAN, PH.D.

Rainfall and Lake Levels 121
R. F. STUPART.

The Blackfoot Language 128
REV. JOHN MACLEAN, M.A., PH.D.

The Dénés of America Identified with the Tungus of Asia 167
REV. JOHN CAMPBELL, LL.D.

Spatial Thresholds of Colours and their Dependency on Contrast 225
W. B. LANE, B.A.

Joseph Brant in the American Revolution 243
CAPT. ERNEST CRUIKSHANK.

The Gametophyte of Botrychium Virginianum 265
EDWARD C. JEFFREY, B.A.

The Picts 295
REV. NEIL MACNISH, B.D., LL.D.

The Function of Indirect Vision and the Use of Coloured and Smoked Eye Glasses 305
A. KIRSCHMANN, PH.D.

Counting and Time Reckoning 311
JOHN THORBURN, LL.D.

Late Formations and Great Changes of Level in Jamaica 325
J. W. SPENCER, M.A., PH.D.

Resemblances between the Declivities of High Plateau and those of Submarine Antillean Valleys 359
J. W. SPENCER, M.A., PH.D.

TRANSACTIONS

OF

THE CANADIAN INSTITUTE.

THREE CARRIER MYTHS.

With Notes and Comments.

BY THE REV. FATHER MORICE, O. M. I.

[*Read 2nd November, 1895.*]

INTRODUCTION.

In point of length and general diffusion, the most important of the legends current among the Carrier Indians is that which records the adventures and many deeds of ʒstas, their national culture hero. But it cannot be described as a Carrier legend: it is merely a Carrier version of a myth which is the original property of the Pacific Coast Indians. Barring some details due mainly to local colouring, its chief incidents are identical, and its hero is but a counterfeit of the Yētl of the Clingit, the Ni-kil-stlas of the Haida and the Kaneakeluh of the Kwakwiutl. Hence, as my studies have so far had for objective the distinctive traits of strictly Déné life and the morphology of the Déné languages, I do not acknowledge myself open to the charge of negligence in not having, to this day, collected more than fragments of that story.

It were tedious, as well as unprofitable, to repeat here what I have said in my former essays of the mixed origin of the Carrier sociology and mythology[1]. It must suffice to remark that better opportunities and prolonged investigations have not changed by the length of one iota my convictions in that respect. Even one of the three legends which I now introduce to the lovers of folk-lore, the second, has but a dubiously Déné origin. I find no equivalent of it in the collection of the "*Traditions indiennes du Canada Nord-Ouest*" published in 1888 by the Abbè E. Petitot[2]. Yet its details and intrinsic features would seem genuinely Carrier.

With the exception of the third, which is widely diffused among different Déné tribes, none of them has, in the eyes of the natives, any paramount importance. If I single them out among the others which I

[1] Are the Carrier Sociology and Mythology indigenous or exotic? Trans. Royal Soc. Canada, Sect. II, 1892.

[2] Alençon, E. Renaud de Broise, Place d'Armes, 5.

have transcribed, it is because I think that, though each of them is given the outward garb of an apologue, the events they refer to can, without exaggeration, be considered as endowing them with the character more of traditions than of myths properly speaking. My meaning will become more apparent from a perusal of the comments wherewith I have ventured to accompany them.

These, I fully expect, will find many an incredulous reader, when they do not excite the supercilious pity of the modern critic. Speaking of the Vedas and the Rigveda is much more fashionable in certain circles than quoting the Bible and referring to the momentous events mentioned in Moses' Genesis. Another school of folk-lorists would also see in the native American myths nothing but personifications of natural phenomena. But I cannot help thinking that the latter's ingenuity would have to be exercised to a rather remarkable degree if they were looking, as they are wont, to the following detailed legends for a figurative account, say, of the daily conflict between light and darkness or some other physical phenomenon. As to the former, I suppose one may always be permitted to refer to the Biblical narratives, were it only as to historical chronicles, independently of the inspired character of their authors.

Moreover, it is but just to add that most of my commentaries are merely hints thrown out more in the shape of queries than as incontrovertible facts. Attempts at identifications, I know, are generally dangerous, especially when their basis is such vague and disconnected elements as those furnished by the stories upon which the present paper is founded. Yet these stories contain a few points which, to my mind, are not without significance, and these I shall try to bring out in all sincerity. I am wedded to no pet theory as to the origin of our Indians, and this freedom from preconceived ideas leaves me so much the more at liberty to speak out my mind frankly.

To the proper understanding of an aboriginal myth's meaning, one should not forget that the native chronicles have absolutely no regard for chronology and very little, indeed, for consistency. They abound in anachronisms no less than in synchronisms; and no wonder. A people having no written literature cannot be expected to have preserved in narratives handed down by word of mouth only the exact order of events. Furthermore, the real facts thereby related are almost invariably hidden under a thick veil of details more or less puerile, and these details are always coloured after the particular environment of the tribe. The human mind cannot grasp or imagine that a duplicate of which the eyes have never seen in whole or, separately, in its component parts. Therefore one cannot reasonably exact from a native story a correct ac-

count of things the like of which the narrator has not seen. Such long ages have elapsed since the events hinted at have occurred and so many generations of aborigines have been accustomed to the mode of life of their present descendants that it is but in order to be indulgent when it is a matter of detail.

One and the same personage is also often made to play the role of various historical heroes, as we shall see further on.

Another point of mythological exegesis which it is hardly necessary to mention is that when the narrative, turning into an apologue, introduces animal characters, these are not, of course, to be taken literally.

There is also a last point which might be noted here, that relative to the mystic or sacred numbers of some myths. But this will be found explained at length in the course of my remarks on our first legend.

The Carrier stories are generally much more elaborate and longer than those current among the Eastern Dénés. They evidence also a tendency to become apologues or allegories not to be found in their Eastern counterparts. Must this be regarded as a mark of a more cultivated mind and consequently of later origin, or should their very completeness be looked at rather as indicative of greater purity? This I leave to the reader to decide.

A word now as to the way the texts have been collected. Most published accounts of native legends purport to be the English version of the words of some old Indian written on dictation by the transcriber. I tried this system when I resided among the Tsiɬɬoh'tin some twelve years ago, but the results were most unsatisfactory. I could find no Indian clever enough to dictate to me without interruptions, repetitions or omissions, any single legend. Therefore it is but fair that I should give an idea of my present mode of transcribing aboriginal myths, so that the reader may be in a position to gauge the degree of accuracy of the following texts.

I have a reliable Indian narrate me as clearly as possible the whole of one myth (when this is not too long) in his native language. I then repeat as verbatim as I can what I have heard, subject to corrections when such may be necessary, and then I write down the whole in Indian. My last step is generally to read out my version in the hope of provoking further notices of inaccuracies.

This mode of gathering native legends may appear rather loose and fanciful. Yet it is but justice to myself, no less than to the present versions, to remark that, as I speak Carrier more fluently than English or even than my native French, my thoughts are generally through the channel of the aboriginal idiom, so that I find no great difficulty in

repeating, and afterwards in writing down in almost the same terms what has been told me. This method has also the advantage of preventing the narrative from being cut up in those short, half-line sentences common to the stories transcribed on dictation, and which some may wrongly believe to be the normal condition of Indian phraseology.

The English translations of the following legends have been made in as simple a style and as literal as was possible consistently with intelligibility and clearness of expression. Hence the quaintness of some passages.

I.—PURSUED BY THEIR MOTHER'S HEAD.

Told by Lizette Elmok, of Stella (West End of Lake Fraser).

A man was living with[1] a woman. He always slept away from her whenever he was preparing his traps[2], and he observed faithfully all the ancient prescriptions. Yet he could catch no game. Animals wanted him not[3]; they all avoided his traps. Each time that he returned home from a visit to his traps he found his wife with her face painted and her hair carefully combed.

One day that he had left as usual, he spied her from afar, and noticed her painting her face and carefully combing her hair. Then she set out for a tree, dried up yet standing[4]. Once she had reached its base, she seized a stick and therewith struck the tree several blows. Presently two big serpents crept down from the top of the tree and knew her[5].

Now that he knew why game avoided his traps, her husband returned home unseen by her, and there arrived, he spoke not a word. But shortly after, he took a big knife, concealed it in his bosom[6] and made for the dried-up tree. Then he did as he had seen his wife do, struck the tree with a stick and when the two big serpents had come down creeping on him, he cut their heads off with his dagger. He next set their mouths and eyes a-yawning by means of splinters and carried them home.

---

[1] *Yə-rə-šta*, lit. "was sitting near". Is used to designate the matrimonial union.

[2] See "Notes on the Western Dénés," Trans. Can. Inst., Vol. IV., p. 108.

[3] Carrier idiom. The natives always speak of caught game as if a sort of sympathy existed between it and themselves.

[4] The Carrier word *tcən-ɣaih* means all that.

[5] In the biblical sense of the word.

[6] The dress of the primitive Carriers being devoid of pockets, any object carried about the person was either suspended from the neck or from the belt, or, if concealment was desired, stored in the folds of the tunic.

As soon as he got home, he ordered his two little children off, and before they went, he gave to the eldest one, a child of five or six snows, a stone arrow-head, a *ɹivəstco*[1] thorn, a red woodpecker's[2] tail and a stone dagger. At the same time, he loaded the eldest child with his little brother who was still in the moss[3]. He finally passed his hand over the little one's mouth, and thenceforth the babe could talk as a grown up child.

The two children, the elder packing the younger, had no sooner departed than their father killed his wife by hurling at her the two big serpents' heads. But as often as a well-directed blow had cut her body asunder, the disjointed parts immediately reunited themselves, so that he could not tear her up to pieces as he wished. Therefore he had to give it up. He simply cut her head off and threw it out of the lodge. Her body he dropped in a rapid near by.

While the two brothers were going on at random, the younger, who was packed by the other[4], saw of a sudden their mother's head coming out after them. Then he said: "Elder brother, mother's head is pursuing us". Whereupon his elder brother threw out behind himself, without turning back, the stone arrow-head which his father had given him. The arrow-head became at once a mountain which, for the while, cut them off from their mother's pursuit.

But their mother's head was changed into wind and continued to pursue them. "Elder brother, mother's head is still after us," said the little one in the swaddling clothes. Thereupon his brother threw behind him, without looking back, the ɹivəstco thorn handed him by his father. The thorn transpierced the head and set it bleeding, after which it was transformed into a thorny bush. The bush grew to a prodigious height, and for a moment it barred the passage to their mother's head. But the head finally jumped over it and continued to pursue them.

Therefore, the child in the moss said again: "Elder brother, mother's head is still coming after us." Then the eldest child threw behind him

---

[1] *Crategus tomentosa.*

[2] *Sphyrapicus varius.*

[3] The Carriers use moss as swaddling clothes. See "Notes on the Western Dénés," Trans. Can. Inst., Vol. IV.

[4] The reader should also remember that our aborigines always carry their babes on the back with their face turned in an opposite direction from that of the packer, and that the child is carried in an upright position.

the woodpecker's tail, which was instantaneously changed into fire[1]. Yet the head passed through the flames and was still after them.

They then reached a very large lake, a lake so large that the opposite shore was invisible. A narrow dam was formed across the lake, on top of which they passed as on a trail. The dam was disappearing immediately behind them, so that no roadway was left. Yet their mother's head was following them in the air. The eldest child sent it a blow[2] with his dagger, whereupon two whales[3] jumped out of the water and swallowed it.

When they had landed on the other side of the lake, the elder child deposited his little brother down against a stump and made him a ball[4] to play with.

While the little one was amusing himself therewith, an old man was sighted on the lake who manned an iron raft[5]. Soon after, the old man landed his craft close by the two brothers. Now it happened that the little child's ball fell by accident on the stranger's raft. As the babe was crying for his toy, the old man bade his brother come and fetch it over to him. But as soon as the child was aboard, the old man drew out and made for the middle of the lake. Which seeing, the babe left on shore leaped out of his swaddling clothes and, transformed into a wolf, set out to follow as well as he could the outgoing raft, even as a dog uses to run for us when we are navigating a piece of water.

Meanwhile his brother was bewailing his fate, and kept constantly weeping after him. Therefore, to console him, the old man said: "Weep not; I have at home two beautiful daughters: I will give them out to you as wives."

When they had reached the opposite side of the lake, the old man left the child on the iron raft, and went out to his lodge which was built close by the shore. His two daughters were there. So he said to them: "Go and bring over him who shall be your husband." They therefore went down to the beach, and as soon as they had seen the child[6] who had so far remained on the raft, they remarked between themselves that

[1] The tail of that bird is red. Hence the passage is allegorical.

[2] *Yət'si al'to*, "struck at it," but without releasing his weapon, as Moses did at the crossing of the Red Sea.

[3] *Ło-tco*, "fish-big." No land-locked fish is called by that name.

[4] *Nəɣək*. Known to the prehistoric Carriers.

[5] Others say a copper canoe. Iron or copper, however, have here the same signification, which is that the craft was of a magic or wonderful description.

[6] Since he was of marriageable age, he must have been more than a child. Yet the legend calls him a child down to the end. Consistency must not be sought out in aboriginal tales.

he was not the first beautiful child whom their father would destroy. Wherefrom he concluded that the old man was wont to kill children. Yet he followed them into their lodge, and was at once placed between them[1].

After a little while, the old man said to the child: "Let us go by water and bring over some wood to make arrows with." They went out therefore and, crossing the lake, arrived at a place where amelanchier was plentiful[2]. This was the slope of a mountain. So the old man, staying on his raft, sent the child ashore to collect the wood. But while the child was climbing up the mountain, the old man pushed his raft off and left for home.

When he was as yet a short distance from the shore, he called out after the big serpents, whereupon two gigantic snakes darted out of the mountain to devour the child. But the child cut their heads off with the dagger which their father had bequeathed him. He then took one of them, set its mouth and eyes ajar by means of splinters, and, making the circuit of the lake by land, got back to the lodge before the old man had arrived by water. Then he hung the snake's head immediately above his father-in-law's sleeping place.

The old man finally came home suspecting nothing. But having accidentally remarked on his own moccasin a spot as of blood just dropped from above, he looked up and saw the snake's head hanging. This so much frightened him that he ran out for fear and commenced crying after his big serpents; for his he called them.

Some time thereafter he said to the child: "Now that we have the wood for the arrows, let us go for the feathers to fletch them." Therefore they went out again by water and crossed the great lake. As soon as they had reached the shore, the old man told the child that the top of the mountain was covered with the feathers of the thunder-bird[3] and sent him up to fetch some for him. But the child was no sooner out of sight ascending the mountain than his father-in-law drew out again with his iron raft and and set out to return home.

While the child was searching for feathers amidst the rocks of the summit, he suddenly came upon a house and he also met two winged

[1] *I.e.*, was married to them, subject to the trials which he was to undergo at the hands of his prospective father-in-law.

[2] The shaft of the Carrier arrows was invariably of *A. alnifolia* or service-tree wood.

[3] It is a well known fact that most American aborigines believe the effects of thunder to be due to a gigantic bird of the eagle family. The winkings of its eyes produce lightning, while the peals are caused by the flapping of its wings.

maidens[1]. One of them coming up to him said: "Our father is terrible and our mother, too, is terrible; they will kill you." Then the youngest said to him: "It is I whom people call *Su-ne-nəp'i*, the skillful concealer." Therefore she took the child up and hid him under one of her wings' feathers.

When her father came home, he remarked: "How is that? It smells of ʒstas[2]!" To which she made answer, saying: "We have seen nobody." But the father-thunder set upon inspecting each of her wing feathers successively. As soon as he got to the one concealing the child, who was no other than ʒstas[3], the young girl slipped him off so dexterously under the feather just examined that her father did not see him.

Then the thunder-bird began to send forth his bolts. The whole mountain was soon trembling under his peals and his bolts were for a while falling right and left on the rocks of the mountain. It was very terrible. Little by little, however, the father-thunder calmed himself, and the child, whose presence was no more suspected, was at liberty to come out of his place of concealment.

In his agitation the thunder-bird had strewn the top of the mountain with a large number of his feathers. These the child picked up, made a bundle of them and set out to return to the house of his father-in-law, who by that time had got home.

The child therefore descended to the base of the mountain and followed the shore of the lake until he got back to the lodge of the old man. His father-in-law was immensely surprised to see him arrive, inasmuch as he had for a time thought him dead. "Thus it is that this one[4] torments people!" said the child entering the lodge, and then he cast the bundle of feathers down in the fire-place, the ashes of which, floating up in clouds, fell back on the old man. For the child was angry indeed.

Some time afterwards the old man said to his son-in-law: "Let us fly one against the other[5]." To which the child made answer, saying: "It is you who make the proposition, therefore commence yourself." The old man transformed himself into a grey jay[6], and set out to fly

[1] This whole episode is substantially found in a separate legend of an Eastern Déné tribe.

[2] The introduction of ʒstas here is evidently an interpolation.

[3] So said my narratrix.

[4] That is the old man; expressive of spite.

[5] *No'to pe ț'gat'sûțtéh*, that is "let us see which one of us can fly the best."

[6] *Perisoreus Canadensis*, a bird constantly laughed at by the natives, and synonymous among them with stupidity and vain talk.

across the lake. He had proceeded but a short distance when the child clapped his hands together, which caused the jay to fall in the water. He was so helpless that he got drowned, whereupon a great darkness ensued.

Then the old man's daughters commenced lamenting the loss of their father. "He is terrible[1]; he will cause the death of all of us," they said between their sobs. "Do revive him." Their husband went out, therefore, in the old man's raft to where the bird was floating, dead, on the surface of the water. He took it aboard and jumped across it, thereby restoring life to it[2].

Afterwards the child changed himself into a water-ousel[3], and flew across the lake and back without mishap. Consequently, the old man avowed himself beaten. He gave him his own iron raft, together with his two daughters, and let him go and search for his younger brother, who was now a wolf.

So the child went out with his two wives. They alone were doing all the paddling. They landed their husband at every promontory that projected into the lake, and let him follow on foot all the sinuosities of the bays, looking out for his brother-wolf.

After a long journey they reached a place full of footprints. These were caused by dwarfs[4] who were playing on the shore with his brother's skin. Now the child transformed himself into a stump and planted himself near by. When the dwarfs saw it, some said: "It looks like him.[5]" Others differed, saying: "No, it is not like him." Therefore, to identify the stump, they brought out a big snake which coiled itself round it, and which, after uncoiling, declared: "It is a real stump."

Then, during their sleep, the child cut their throats with his stone dagger, and gathering up his brother's bones, he put them back within their skin. After he had jumped across the whole, it began to crawl as does a worm. Some little bones which he had overlooked he added to the others, and again jumped across the whole, when his brother-wolf commenced to walk naturally.

Pehwənəɣət. I translate literally, but the hidden meaning is no doubt that their father is endowed with magic powers.

[2] As well as giving him back his former human condition.

[3] *Cinclus aquaticus.*

[4] *ɣtnane*, which means also foreigners, and is at the present day applied by the Carriers to Indians of all but Déné parentage. Dwarfs, in their mythology, generally play a malefic, noxious role.

[5] That is, like his elder brother.

the ...t him on his raft and set out in company with a muskrat ... you.. ...eaver. The water was soon noticed to rise up at a pro... s rate. It rose and rose until it covered the highest mountains. ...ng still higher, it almost touched the sky, when the child, striking at ... with his dagger, the flood began gradually to subside.

He waited a long time, and then sent down in search of land both the muskrat and the young beaver. Very long after, they both came up to the surface, dead. The young beaver had his paw clutched, but empty, while the muskrat's contained a little mud[1]. This the child took out and kneaded with his hands so as to extend it into an island. After additional handling, it became a large island on which he and his brother-wolf landed.

He then sent his brother-wolf to see how the land was. On taking leave of his brother, the wolf said: "If I come back silent, you shall know thereby that the land is not yet inhabitable. If I howl from a very long distance, it shall be a sign that the land is well." Then he added: "Know you also that you shall die before me."

So he said, and went. Long thereafter he came back in silence, as **the land was not yet inhabitable. But the second time that he had set out to explore the island, he was heard howling from a very great distance. Therefore, ʒstas[2] settled definitely. As for the wolf, he is still in existence, while ʒstas is no more.**

COMMENTS.

The above is the exact reproduction of what the Carriers give as one continuous legend; but its equivalent among their congeners east of the Rocky Mountains is contained in two or more separate stories. Our narrative is, as to form, of a genuinely Dené character; yet as the historical facts of which I believe it to be but a disfigurement belong to the whole human race, that myth is far from local in origin or diffusion. To the unprejudiced reader, at least two most important events of the remotest antiquity will appear as hinted at by the Carrier tradition: I mean the fall of the first woman and the destruction of mankind by the Noachian deluge. These two points shall be separately treated of.

---

[1] In the native mythology, while some animals are assigned a ridiculous or hurtful role, others constantly play the part of a benefactor or of a wiseacre. Among the latter is the muskrat, to which is here due the re-creation of the earth, while in another legend (See *Are the Carrier Sociology and Mythology Indigenous or Exotic?* Trans. Roy. Soc. Canada, Sect. II., 1892, p. 125), it is made instrumental in procuring fire for men.

[2] Another proof of the influence of western on eastern mythology. ʒstas should hav nothing to do with the present legend.

And first as to the relations of the woman with the serpent. Here is, after the original text of Petitot, the Chippewayan counterpart of the tradition:

"A woman lived with her husband. While her husband was hunting, she said: 'I will go and fetch fire-wood[1]'; but she went instead to a big tree full of snakes with which she was living criminally. Then her husband being much displeased and seeing a big tree loaded with fruit and growing among tall grass, he said[2]: 'Husbands, I have come for you; come down creeping!' Then the big snakes came down and the husband killed them all instantly. After he had made a soup of their blood for his wife, his wife said when she came back: 'Husband[3], wait awhile; I will go for some wood and then I will eat.' But her husband: 'No, there is plenty of fire,' said he; 'eat, and then you will chop wood.'

"Finally she went for wood, and, as soon as she got to the big tree, she got very angry and was heard to say: 'I loved dearly my husbands indeed, and behold now they are certainly dead!' Whereupon she returned to her husband; but as soon as she drew near him, he cut her head off with an axe.

"Then he went to the shore of a river, where he found an old woman called the Locust. 'Help me and ferry me across,' he said to her. Immediately the old woman stretched her legs across and let him pass. Then his wife's head having followed him, said to the Locust: 'Ferry me across the river.' Then the old Locust let the head come rolling on her legs; but when the head was midstream, the old woman spread her legs apart, causing the head to drop in the river. Ever since people have not seen it."[4]

It will soon be seen that not only is the Carrier myth more detailed and elaborate, but that it affords much better material for identification with history.

With the exception of that relative to the deluge, few myths have been more generally diffused than that of the woman and the serpent. It is well nigh impossible that such a notion be not founded on fact, nay, on a

[1] The text says "fire," but evidently means "fire-wood."

[2] That is, in imitation of his wife's actions. The eastern narrative could be much clearer, and though the transcriber does not state his method of writing down Indian stories, I suspect that the obscurity of some passages must be due to their having been written on dictation, a disadvantage which would have been avoided by letting the natives narrate uninterrupted the whole legend.

[3] Among the Western Dénés, no woman will call her spouse "husband."

[4] *Traditions indiennes*, etc., p. 389. Another version of the same myth has a somewhat different ending.

fact with momentous consequences, since it has left its impress on peoples so utterly devoid of all kinds of literature as the American aborigines. Woman, serpent and guilt—always of a lascivious character—are three points which seem inseparably connected. In a few cases, it is true, woman and man-serpent may be replaced by man and woman-serpent; but the nature of the relations between the couple remains identical. People will talk of ophiolatry; they will discourse on the Ophites and their unnatural cult of the matter, the serpent, as opposed to the spirit personified by their so-called Demiurgos, the Jehovah of the Bible; they will write learned dissertations on the serpent mounds of the old world and of the new; but if they cared to go to the root of the question, I think they would infallibly find guilty relations, either by word or by deed, between a representative of the human species and a serpent as the ultimate source of such monuments or religious systems.

In the case of the Ophites, it is a matter of notoriety that they worshipped the serpent because, by tempting Eve, he had introduced "knowledge"—*intelligenti pauca*—into the world. That the serpent effigies of America had a cognate origin can be proved by the relics a few of them have been found to contain; but more especially by the prevalence among the aborigines of the tradition of immoral commerce, in times remote, of a woman with a serpent.

Thus in Adams county, Illinois, a serpent effigy has been discovered with fire-beds and evidences of cremation of bodies in the bottom of the mound. Now, the phallic symbol was found there. Nay more, "the skeletons of two snakes were found coiled up between the hands near the secret parts" of some of the bodies[1]. The connection between the serpent and the woman, at least by implication, is here evident. In the first case, we have the ophidian mound and the phallic symbol, and in the second, serpent and lasciviousness are associated in a still more suggestive manner.

No less suggestive are the following facts gleaned from the mythologies and the archæological remains of the most important American nations.

As is gathered from the Codex Vaticanus, corporal ills were supposed among the early Mexicans to be produced by as many causes corresponding to the different parts of the body. Their therapeutics must have had something of a homœopathic character, since their doctors cured, for instance, the diseases of the tongue by the earthquake, those of the breath by the air, those of the teeth by a flint, etc. A coloured plate

[1] American Antiquarian, Vol. XVI., p. 17.

reproduced in the Tenth Annual Report of the Bureau of Ethnology[1] explains these mysterious relations. Now the cause assigned to venereal diseases was the serpent, and the serpent was regarded according to the commentary thereon "as that from which their diseases proceeded in their commencement[2]."

The culture hero of the Aztecs, in whom was also worshipped the human reproductive principle, was Quetzalcoatl. According to Dr. D. G. Brinton[3], who speaks after Torquemada[4], "he was the god on whom depended the fertilization of the womb," and "sterile women made their vows to him, and invoked his aid to be relieved from the shame of barrenness." Now one correct translation of his name is "the beautiful serpent" and one of his surnames is, in the Nahuatl language, synonymous with the virile member. Serpent and phallus—and, by implication, woman—are here again associated.

In the volume emanating from the Bureau of Ethnology quoted above is also reproduced what looks as a pictograph which is stated to have been found in Guatemala. It represents two personages, one, a skeleton, probably symbolical of death, and the other, a person with an emaciated face and in a recumbent position, evidently indicative of a state of sickness. The cause of this is clearly shown in the shape of the serpent, which here again has the same suggestive relation to man, since it is made to encircle the loins of the diseased personage[5].

But a still stronger argument can be derived from the prevalence of the serpent myth among the American aborigines. We have already noticed it among two different Déné tribes. Among the Abenakies the story is that an oft-married woman was followed by her sixth husband to a wild place among the rocks and finally to a pond. After she had sung a song, a serpent came out of the deep which twined around her and enveloped her limbs and body in its folds[6]. Here we have, therefore, adulterous intercourse with death as its consequence, viz., that of her successive husbands. A variation of the same myth recounts the similarly guilty commerce between a married woman and Atosis, a beautiful serpent.

Among the Zunis, the serpent is said to have gained power over the daughter of a priest-doctor who was wandering near a lake and married her.

---

[1] Washington, 1893, Plate XLIX.

[2] Tenth Annual Report, etc., p. 614.

[3] American Hero-Myths, p. 128. Philadelphia, 1882.

[4] *Monarquia Indiana*, Lib. XI, Cap. XXIV.

[5] *Ubi Supra*, p. 730, fig. 1235.

[6] American Antiquarian, Vol. XVI, p. 29.

A story of the Tusayans relates the adventures of a mystic Snake Youth, who brought back and married a strange woman. She gave birth to rattlesnakes which, biting the people, compelled them to migrate[1].

In the Blackfeet mythology the story of the woman and the serpent is so much alike to that of our Carriers that we must trace its main details to a common origin. Briefly told, it is as follows:—The wife of a hunter had a black-snake for a lover, which lived in a cavern or den in a patch of timber. The children set fire to the timber and were chased by the head of their mother, while the body went after the father. The children threw sticks behind them, which became forests; stones, which became mountains; moss, which became a river, into which the head rolled and was drowned[2].

Now as to the identification of these various traditions with sacred history. According to the Carrier legend, a wife had criminal relations with two big serpents—why *two* will soon be explained. Her husband kills the snakes, cuts off his wife's head and throws it out of the lodge with the result that her children become miserable, wandering over land which is not theirs and incessantly pursued by their mother as if they had to pay for her own guilt. In the same manner, through guilty intercourse with the serpent hailing, as in the American legend, from the tree of "knowledge", Eve deserved death at the hands of her Lord and was punished even in her posterity. She was driven out of the terrestrial paradise, and her children have now to suffer for the sin of their first parent.

The myth as current among the Déné (Carrier and Chippewayan) and the Algonquin (Blackfeet) tribes is rendered even more significant by the fact that even in far-off Ceylon, the natives venerate a statue representing the first woman naked and with a snake coiled round her. Now that woman is represented there *headless* and *at the door* of the temples, while her head is, according to Petitot[3], placed on the outside of houses as a talisman against her own malefic powers.

As to the two serpents of the Carrier myth, the duality of the reptile is a matter of mere mysticism of numbers. The sacredness of the number seven among the Semitic nations is well known. Persons ever so little conversant with American mythology are no less aware of the frequent occurrence in native legends of the number four and the mystic virtue

[1] A study of Pueblo Architecture, by Victor Mindeleff. Eighth Annual Report Bur. Ethnol., 1891, p. 17.

[2] Rev. S. D. Peet in Am. Antiq., Vol. XVI, p. 30.

[3] *Traditions indiennes du Nora-Ouest*, p. 393.

supposed to be attached thereto. Thus, to choose an example among hundreds, according to the Navajos, the adopted daughter of the first woman reached maturity in four days; a stranger appeared to her in the woods on four successive days, with whom she thereafter passed four nights. Four days afterwards she gave birth to twins, who in four days grew to manhood, and for four days more remained near the place of their birth. Having gone to the house of their father, who was no other than the sun, the latter's wife was asked four times what had become of them, and, upon their being delivered up to their father, the sun impaled them on spikes of iron set up at each of the four corners of the earth, etc.[1] The same tribe's mythology speaks constantly of four worlds, four winds, four mountains, etc. Folk-lorists are well aware of the fact that the Mayas, the Aztecs, the Sioux, the Algonquins, in fact almost all other American tribes, attach the same importance to the number four[2].

Now, by a curious exception, this is replaced among the Carriers—and possibly among other adjacent tribes—by the number two. Thus in the preceding myth, mention is made of two serpents when one would have done just as well for the purpose; the unfaithful wife has two sons; her head is swallowed by two whales (a circumstance rather hard to account for!); the old man with the precious raft has two daughters, and kills people by means of two serpents. The thunder-bird has likewise two daughters. Finally two animals are taken on the Déné Noah's raft, and the hero does not settle on the new land before the wolf has gone twice to explore it. Another myth recounting the deeds of a sort of Carrier Hercules mentions among the latter's victims two giant snakes, two giant toads, two giant spiders, etc.

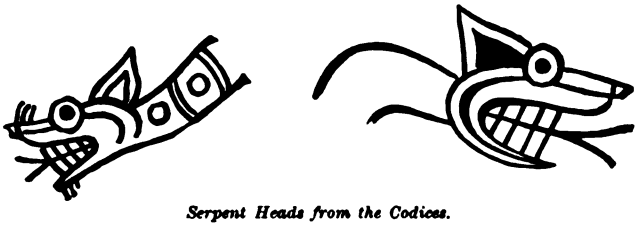
---

[1] A part of the Navajo's mythology, by W. Matthews, Am. Antiq., April 1883.

[2] Speaking of the symbolism of the number four, I cannot refrain from hazarding a remark which may have its usefulness. There is a very prevalent disposition on the part of such folk-lorists as look to nature and the natural phenomena exclusively for an explanation of native myths, to see in the cardinal points north, south, east and west, the chief reason of the sacredness or of the widespread use of the number four among American aborigines. Their theory is probably grounded on fact as regards certain southern, half-civilized tribes; but I cannot help thinking that, in some cases at least, their explanation is wide of the mark. It should not be forgotten that the points of the compass are but imaginary divisions of space introduced for the sake of convenience by the abstract-grasping mind of the white and other superior races. At all events, some American tribes hardly know any such divisions. This is so true that the Carriers, whose vocabulary possesses some abstract terms, have not even any name for these would-be all important cardinal points. With them the east is *sa paɔ'aih t'séh*, "whence the sun rises up;" the west, *sa naɔ'aih t'séh*, "where the sun sets;" the north, *ho'kwɔz t'sɔ*, "the direction of the cold," etc., all explicative phrases, but no real words. Yet their language is rich in locative terms, most of which express some reference to a piece of water, lake or river. Such are, for instance, *mi*, "up" (*i.e.*, up stream or opposite to the outlet of a lake); *nta'*, "down" (stream); *no'*, "inland" (*i.e.*, away from the water); *ntsɔn*, "down," towards the shore, etc., etc.

Therefore the two adulterous serpents of our present legend can be considered as one.

A detail which the reader may have noticed in that legend is that the injured husband sets ajar by means of splinters the mouth and eyes of the decapitated snakes. As this circumstance occurs twice in the course of the same story, it is evidently mentioned on purpose. What that purpose may be is more than I can say. Is it revengeful irony at the now helpless condition of the monster, or allegorical of its malice as the source of all evil? An important analogy might be found between this point of the myth and the style of drawing serpent heads common to the semi-civilized nations of Mexico and Peru. On the codices, these heads are generally remarkable for their mouth kept yawning by means of what



Serpent Heads from the Codices.

looks more like extraneous adjuncts than natural teeth. I herewith figure two examples in confirmation of my remark.

Another point of the native theogony perhaps worth noticing is the supposed efficacy of the act of jumping across a subject. Thus the Child of our tradition jumps across the corpse of his metempsychosed father-in-law, who thereby recovers life. So he does later on, and with similar results, with regard to the bones of his brother. This act must have had to the original Indian mind a hidden meaning; for we find that the Kutchin or Loucheux of the Mackenzie River, in common with the Hare Indians, have a periodic festival, not unlike the Phaset of the Hebrews, on the occasion of which the death chant is sung, thus: "O mouse with the pointed nose[1], hasten to jump twice across the face of the earth[2]!" One feels inclined to hazard as a possible explanation the Egyptian cross, the key of life and health and its probable equivalent on the ancient tau-shaped coppers of the North Pacific tribes, both of which were perhaps nothing else than the symbol of the daily course of the life-giving sun across the heavens. If this be the case, our Indians have long lost all idea of the true signification of this mysterious act.

Might not the flight and vicissitudes of the two Carrier heroes pursued

[1] The French *musaraigne.* [2] *Traditions indiennes*, etc., pp. 62 et 186.

by their mother's head be considered as a vague reminiscence of the continual journeying of the Hebrews led by the two brothers, Moses and Aaron, away from the land of Egypt which had nursed them for four centuries? There would be nothing very extraordinary in one point of a native myth recalling two facts of analogous nature. The issue of the feud between pursuer and pursued, at least, seems in both cases strikingly similar. After having pursued by land the fugitive Israelites, Pharaoh, reaching the shores of the opened Red Sea, makes bold to follow therein the tracks of his former slaves. But Moses stretches forth his hand over the sea and his pursuer comes to grief together with his army, all being drowned by the return of the waters. In like manner, the Déné Moses long followed by the head of his mother, finally comes upon a large lake which he crosses in a miraculous way. As his tormentor is still after him, even in the middle of the lake, he stretches forth his wonder-working dagger, whereupon his enemy is instantly drowned, or devoured by a monster fish, which is practically the same.

The Carrier hero's adventure on top of the mountain and his meeting with the thunder's children, followed by their father's anger, have counterparts in the mythology of no less than three different native tribes east of the Rockies. It would be too long to reproduce each of them. This part of the myth being so widely-spread must have some importance. Might it not be a vague reminiscence of the giving of the tables of the law to Moses amidst the peals of thunder on the Mount of Sinai and of the casting away of the same at the sight of the prevarication of Israel? The anger of the Carrier hero who throws the bundle of feathers in the fires, the ashes of which finally cover up the old man who has treacherously left him for dead on the mountain, might then recall to mind the irritation of Moses caused by the unfaithful Israelites who had abandoned him and were despairing of his ever coming back to them, and who, on his return, were compelled to swallow the very ashes of the golden calf. This, however, might be too far-fetched, and is given simply as a hint to lovers of identifications.

Another part of the myth which I feel much bolder in assimilating to the Biblical narrative, is the end of the Carrier text. This, I think, everybody will agree, unmistakably points to the destruction of mankind by the deluge. In Moses' account of the cataclysm, mankind is punished for its sins by a flood, the waters of which cover the highest mountains and from which only Noah and his family escape, being floated on the waters by the ark. In the Déné narrative, the waters similarly reach above the highest peaks, and the deluge immediately follows the wrongs

inflicted by the dwarfs on the brother of the hero, Ægstas, who appears here in the combined role of Noah and of Jehovah.

When the waters have subsided somewhat, the Biblical Noah sent out a raven "which went forth and did not return till the waters were dried up upon the earth[1]." The Carrier Noah sends down the beaver and the muskrat, which do not return until one of them brings up a little mud.

Moses' Noah then sends forth a dove "to see if the waters had not ceased upon the face of the earth,[2]" which returns as a sign that the land is not yet fit for man to inhabit. Likewise the hero of the Carrier legend sends out the wolf to see if the island is inhabitable, with the result that it soon returns with the silent message that it is as yet unfit for him to dwell upon. It is not before a second trial, the equivalent of the second sending of the dove, that he is told by the howling of the wolf, as Noah was by the carrying of the bough of the olive tree, that the earth is henceforth fit again for habitation.

Nobody, disbelieving the autochthony of our Indians, will be astonished to find the remembrance of the deluge vivid among them. That tradition is universal throughout the old world. It is to be found, under one form or another, among the principal nations of antiquity no less than among the aborigines of the new world. Noah and his ark have their counterparts in most of the known mythologies. Everybody is acquainted with the Deucalion Sisyphes of the Greeks: now that personage has duplicates in the Xisuthrus of the Chaldeans, the Yima of the Iranians, the Khasisatra of the Babylonian inscriptions, the Manu of the Hindoos and the Fo-hi of the Chinese.

The universality of the tradition baffles all attempts at incredulity on the part of the most hardened sceptic. What is not quite so clear is the question as to the extent the catastrophe really prevailed. Three different views have been advanced on the subject. There is the opinion, now held by few well informed writers, that the deluge was universal both geographically and ethnographically. The second view, which is now very prevalent among competent critics of all creeds and nationalities, estimates that it was indeed universal ethnographically, but not geographically. Lastly a third opinion, which is held by authors of repute and undoubted orthodoxy, would have it that the catastrophe had no really universal effects, either as regards the earth, or relatively to its inhabitants.

These remarks may appear in the light of an unnecessary digression;

[1] Gen. viii., 7.

[2] *Ibid.*

but if digression there be, I think it is not without its usefulness in a paper on Indian traditions. This is my point:

If the Noachian deluge was universal neither geographically nor ethnographically speaking, our aborigines must be assigned a probable Asiatic origin, either by descent or by contact, since they have not forgotten that event. Asiatic, have I said: they could not be represented as coming from Africa, for all the black races are remarkable for the absence in their mythology of any allusion to the deluge. Moreover, the physiological differences between the Africans and the Americans are, of course, too pronounced to admit of any serious comparison between the two races. They could not be said to originate from Oceanica, since the inhabitants of that part of the world are no less devoid of any tradition traceable to the deluge. They could hardly be represented as of European origin, as, in the third hypothesis relatively to the extent of the cataclysm, the flood is not supposed to have extended to that continent, and the few versions of the Noachian deluge found among its primitive inhabitants are of too vague a character to have stood the assault of ages among the uncultured savages who would be supposed to have derived their present traditions on the subject from the original European peoples.

But, a student of the Algonquin mythology will object, the story of the floating raft and the muskrat refers, not to the deluge, but to the creation. I have noticed that position taken by a commentator on a Blackfoot equivalent of that portion of the Carrier myth, and even Dr. D. G. Brinton, who sees therein neither creation nor historical deluge, calls it "the national myth of creation of the Algonquin tribes.[1]" In answer to that objection, I need only refer the reader to the Carrier version such as presented above, wherein we see the earth peopled before the catastrophe and a gradual submersion of the globe. In confirmation of this might also be adduced the fact that the Indians referring to that event never call it the creation or re-creation of the world, but most pointedly *to ɔ-tha-dəthîzpən* which means "the filling up with water."[2]

To make it doubly sure that the end of the Carrier myth really refers to the deluge, I reproduce here, after Petitot, the corresponding tradition current among the Hare Indians, their congeners in the North-East. It will be seen that the latter can be identified with even less difficulty with the

[1] American Hero-Myths, p. 41.

[2] The expression is thus analysed: *to*, up, an adverbial form which requires immediate and intimate connection with the verb; *ɔ*, sign of the past tense proper to the actualitive form of some verbs; *dəthizpən* means "filled," and implies at the same time the beginning of a past action.

Mosaical account. After several details practically identical with those of the Carrier legend, such as the quest for arrow-shafts and arrow-feathering, with the adventure with the thunder-bird and its children replaced here by the eagle and the eaglets, the Hare story goes on to say :—

"Then the Wise One made a great raft at the horizon[1]. 'What do you mean with this raft?' they said. Then he said: 'If[2] plenty of water comes, I will go aboard.' 'Oh! as for us we will climb up the trees,' they said. 'Then as for me, if[2] there is a flood, I will stay on the raft,' he said.

"It being so, he made big ropes so and so, worked with many things and made a big raft.

"Therefore the water seemed suddenly to thunder forth, all men climbed on the trees, there came plenty of water, all men perished. Therefore the Wise One having tied his raft with ropes, was floating along. He also placed on his raft pairs of animals, of carnivores and of birds.

"'There will be no more land,' he said to them. For a long time there was no more land: it was being said that there was no one to go in search of land. The muskrat dived and went in search of land. He came up to the surface almost dead. 'Nothing at all!' he said . . . The beaver having dived after him, was not seen any more for a long time; but afterwards he came up swimming, having a little mud in his hand which he gave to the Wise One. The old man put it on the water. As he wanted the earth to exist again, he blew on the mud, making it a little big. He placed on it a beautiful little bird, whereby it became still larger. Then he let out on the land a fox which ran around it and made it grow still more. He slept once, twice, thrice, four, five, six times running around it[3]; whereby it became whole[4].

"The Wise One having put back the animals on the earth, he landed himself with his children. 'What a number of men there shall be again on the earth!' he said. Then there were again many men[5]."

As hinted above, the Algonquin tribes have a myth wherein the muskrat plays exactly the same role as in the Carrier legend and the beaver in its counterpart among the Hare Indians. The only difference in the

[1] Literally, at the edge of the sky.

[2] *If* and *when* are rendered by the same word in Déné.

[3] That is, the fox ran around it on six consecutive days.

[4] *I.e.*, came back to its normal state of existence.

[5] *Traditions indiennes du Canada Nord-Ouest*, p. 129.

narratives is that the ʒstas of the one and the Wise One of the other are replaced in *some* Algonquin versions by Michabo, the "Great Rabbit." It has been fashionable in certain quarters to indulge in covert sneers at the expense of those who see in some native legends an echo of the past rather than mysterious, enigmatic personifications of natural phenomena. Therefore I will now give in a condensed form the explanation of that myth proposed as the only true one by the most prominent among the allegorical school of folk-lorists, Dr. D. G. Brinton, leaving it to the reader to decide whether his subtleties of speech are more convincing than my own interpretation of the same story.

"In the Algonquin tongue the word for Giant Rabbit is *Missabos*, compounded from *Mitchi* or *Missi*, great, large, and *wabos*, a rabbit. But there is a whole class of related words . . . which sound very much like *wabos*. They are from a general root *wab*, which goes to form such words of related signification as *wabi*, he sees, *waban*, the east, the Orient, *wabish*, white, *bidaban (bid-waban)*, the dawn, *wában*, daylight, *wasseia*, the light, and many others. Here is where we are to look for the real meaning of the name Missabos. It originally meant the Great Light. . . . I believe that a similar analysis will explain the part which the muskrat plays in the story. . . . The word for muskrat in Algonquin is *wajashk*, the first letter of which often suffers elision. . . . But this is almost the word for mud, wet earth, soil, *ajiski*. There is no reasonable doubt but that here again otosis and personification came in and gave the form and name of an animal to the original simple statement. *That statement was that from wet mud dried by the sunlight, the solid earth was formed*[1]."

The italics are mine.

In rebuttal of the above, I beg to submit that even in some Algonquin versions[2] Michabo or Missabos is replaced by the Old One, and in that case the ingenious fabric of Dr. Brinton loses its *raison d'être*. Furthermore, even when the Algonquin hero's personality remains of an animal character, his name varies from Michabo to Manibozho, Nanabush, Messou, Mideathon and Hiawatha[3], which I suppose could not be diverted into meaning the Great Light, etc. As to the identification of the muskrat with the wet earth, the soil, through the quasi-homonymy

[1] American Hero-Myths, p. 41-42.

[2] As in that current among the Blackfeet. See "The Owl," University of Ottawa, May 1890, p. 298.

[3] Notes on Primitive Man in Ontario, by David Boyle, Toronto, 1895, p. 18. It may be added that some Algonquins credit the osprey with the success generally attributed to the muskrat.

of the name of both in one Algonquin dialect, if Dr. Brinton's interpretation be the correct one, it must be paramount to stating that the myth itself has an Algonquin origin, since the same play with the words is impossible in connection with their Déné names (*yən* and *tsé-'kér*). Is there any real proof of this priority of origin?

II.—THE BURNING DOWN OF A COUNTRY.

Told by Abel Nəthətcas, Chief of Thatce, on Lake Stuart.

A young man was living with a young woman. All the other women were bringing to their husbands basketsful[1] of *'kərmih*[2] or sap; and yet his wife used to come home with a single shaving of it which she brought him in the hand. He wished to ascertain the reason of this; therefore he followed her one day at a distance. As soon as her fellow-women had reached a place in the woods planted with scrub pines, he saw her proceed on her way, while the others were busying themselves with the scraping of the sap.

When she had reached the trunk of a tree, dried up but still standing, she commenced striking it with a stick, repeating each time: *kəléj! kəléj!*[3]. Soon a beautiful young man, white as daylight, came out of the top of the tree and played with her.

Thus the young man knew why his wife used to bring him so little sap; so he returned home and arrived there before she got back. Then his wife scraped off as usual a single ribbon of 'kərmih, and took it home to her husband, carrying it in the hand.

One day that she was to return with the other women to collect sap the young man said to her: "Really you do bring me too little 'kərmih. See how the other women are always loaded when they come home. Therefore, lend me your blanket[4] and your scraper: I will go for it myself."

So he said, and then he clothed himself with his wife's garments and went with the other women, packing an empty *tcaɬyaɬ*[5]. But he stopped not with them among the scrub pines; he went on as far as the dried up

[1] *Tcaɬyaɬ tizpən.* The tcaɬyaɬ cannot quite properly be called a basket, but it is its equivalent among our Indians. For figure and description of the utensil, see *Notes on the Western Dénés*, Trans. Can. Inst., Vol. IV., p. 120.

[2] The *'kərmih* is the sap or cambium layer of the scrub pine (*P. contorta*), scraped off in thin shavings by means of a bone scraper. *Op. cit.*, p. 76.

[3] Words now devoid of meaning, at least among our Indians.

[4] That is her outer garment.

[5] See note [1] above.

tree. Immediately he set upon striking it with a stick, repeating the words he had heard his wife utter.

Soon enough the beautiful young man white as daylight made his appearance, fell down upon the disguised husband and played with him as one would with a woman. He was trying to know him[1], when the husband cut his head and testicles off with a knife he had kept concealed in his bosom[2]. The head was no sooner separated from the trunk than it was changed into a red woodpecker's scalp. Then he scraped off a great quantity of sap. When he had filled up his tcaɬyaɬ therewith, he hid among the shavings of the 'kərmih what he had torn from the daylight young man.

Home again, he presented his wife with the whole, saying: "See what a load of sap I have brought you. Eat it." She therefore began to eat of the 'kərmih, suspecting nothing. But as soon as she had seen the red woodpecker's scalp, she hung down her head, refused to eat any more and commenced to weep. "What ails you?[3] Why weep you?" asked her husband. But she answered not and continued weeping.

At the same time columns of smoke were seen all around and tongues of fire appeared on all sides. They soon concentrated themselves towards the point where the couple stood. Very many men perished by fire; only a few escaped.

Meanwhile the red-headed woodpecker[4] was flying to and fro amidst the smoke and flames repeating its usual cry: *tcan! tcan!*[5] This caused a few drops of rain to fall which, however, had no marked effect on the conflagration. Then he was heard to say: "Let the scalp of my cousin[6] be given back to me!" For a time people did not know what he meant. At last some one remarked: "Since he wants his cousin's scalp, let it be thrown up[7] to him!" Therefore, while the little woodpecker was flying amidst the flames, the red woodpecker's head[8] was thrown up to him.

A shower fell at once, which soon extinguished the fire. But in his

[1] In the Biblical sense of the word.

[2] In the Carrier mythology, weapons carried in the bosom are always for a nefarious purpose See first legend, p. 4, also "Notes on the Western Dénés," p. 52.

[3] *Tâmqa?* lit., "What are you feeling?"

[4] *Melanerpes erythrocephalus*; in Carrier, *tsèl'kən*, "red-head."

[5] *Tcan*, which to the native ear represents that bird's cry, means "rain" in Carrier.

[6] *I.e.*, the red woodpecker (*Sphyrapicus varius*).

[7] To throw to and present with are rendered by the same word in Carrier.

[8] The similarity of names renders this part of the myth rather obscure in English. This is not the case in Carrier, where the smaller woodpecker is called *tsèl'kən*, whilst its "cousin" goes by the name of *intsij*.

efforts to attract attention, the little woodpecker got the end of his tail burnt, and this explains why it is to this day coal-coloured.

COMMENTS.

This is one of the shortest of the Carrier legends. It is either an idle tale, to while away the long night hours of a hyperborean winter; an allegory concealing under a circuitous phraseology a truth of more or less importance or some cosmogonical phenomenon, or again a legend to be considered as a feeble echo of a historical event. The first hypothesis is, to my mind, entirely gratuitous. Aboriginal tales do not, as a rule, web their fallacious thread around a moral thesis of such an extraordinary description as that pointed out in our myth. There is no lack among our Indians of fabulous stories which are real meaningless tales; it would suffice to reproduce one here to make the difference between them and the above plain beyond dispute. If an allegory, I would ask: Where have our people gone for the subject matter, sodomy, to be thereby reproved? They know the crime neither in name nor in deed. Or, again, what natural phenomenon could be said to be thereby hinted at? There remains the third hypothesis which may be a mere supposition, yet a supposition with something like a basis and not a little probability in its favour.

The very title of the story is, in the native tongue, grammatically mysterious and mythologically suggestive. *Intziį 'qa hwotətt̂į'kan*, the name it receives in the various versions, means literally: "He (or it) burned down (a country or a town or the universe[1]) against (*i.e.*, in opposition to, in punishment of) the Red Woodpecker." *Hwotətt̂į'kan* is a transitive verb and as such it must have not only a subject but a complement, expressed or implied. What is the subject? Is it *Yuttəre*[2], the impersonal Deity of the ancient Carriers? It would seem that none other could be imagined. As for the implied complement, it must refer to some locality, not the whole universe, since the text affirms positively that some men escaped from the conflagration. We are thus warranted in translating the title: A country was burned down by the Deity in punishment for the Red Woodpecker's misdeeds.

Barring the mention of the bird's name, which is here evidently symbolical, I would ask in all frankness: Does history record the burning of any other inhabited region than that of the famous cities of the plain,

[1] Were not an extent of country, town or district, implied, the verb would be *tətį'kan*, not *hwotətį'kan*.

[2] Lit., "that which is on high." See "The Western Dénés," Proceedings Can. Inst., Vol. VII, p. 157.

Sodom and Gomorrha? It may seem strange that a historical event of comparatively so local an importance should be commemorated in the folk-lore of an American people. Yet it might perhaps be explained that the awfulness of its nature compensates for the limitedness of the territory which it affected. I may be mistaken in my interpretation of this, as indeed in that of the preceding myth; but I cannot help seeing therein some resemblance to the story of Sodom's prevarication and chastisement, and a corresponding dissimilitude from any other event recorded either by history or mythology. Let us rather analyse the main points of our present legend and compare them with the Biblical recital.

And here I must premise an important remark. This myth, in common with the preceding, recounts the story of a crime and its consequences; but a very little reflection will make it clear that the guilt pointed out as material for punishment is, in the second legend, of a quite different nature from that of the first. In the first story, we see criminal relations of a woman with a serpent punished by the death of the woman and the wretchedness of her children. In the second, we have also guilty intercourse of a married woman with a person other than her husband; but, let it be carefully noted, this is not put down as the cause of the conflagration that ensues. After her unseemly conduct, the woman suffers no other pain or anguish than regret for the death of her lover, while the whole country, and with it a large portion of the people, are burnt down in expiation of the attempted crime of the beautiful young man with the outraged husband. Can sodomy be more graphically described or its punishment better assimilated to that of the ungodly inhabitants of the plain cities?

The husband here, no less than the God-fearing Lot of the Bible, escapes free; while the cause of the conflagration, the voluptuous young man, in common with the majority of the population, pays with his life his unnatural crime.

The gathering of the sap or cambium layer of the pine with the apologue of the little red-headed woodpecker are naturally nothing else than the pod which contains the fruit, the shell that conceals the pearl, namely, the historical fact. So much so, that these circumstances vary with the locality of the narrator, while the nature of the guilt itself with its consequences remains identical.

The native fondness for the apologue is no doubt responsible for the anecdote at the end, no less than for the transformation of the young man's head into a bird's scalp. Unable to account for the fact related by their ancestors, the aborigines must have thought they had discovered

in nature an adequate explanation of it. The woodpecker (*tntsij*) is fire-coloured; therefore to it must be ascribed the cause of the raging flames. Its congener, the *tsèl'kɔn*, is fond of crying for rain: *tcan! tcan!* Who else then could have been instrumental in extinguishing the fire? This is what is called fiction; it widely differs from the part of the tradition above commented on.

But, a reader may object, if such a characteristically Jewish tradition has found its way even into far-off America, must not the aborigines who now relate it be assigned a similarly Jewish origin? Now, has not this theory been exploded long ago? To which I beg to answer:—

To conclude from this single fact to a Jewish or simply Semitic origin for our Indians, would be to outreach the premises. On the other hand, to pretend that their ancestors have had no intercourse, direct or indirect, even possibly by intermarriages, with a population of Semitic descent is, I think, more than could consistently be done. I am not here to discuss the origin of the Dénés, a question on which, I repeat, I have no fixed convictions; but I may be permitted to remark that several peculiarities of their mode of life, their customs, their language, and even some of their mythological allusions[1] would assign them a mixed origin. As the question at present stands, they cannot be considered as autochthonous on the American continent; several of the traditions of the Eastern Dénés point to a western region as the place of the tribes' birth. Now, west of their present territory you are confronted by the North Pacific Coast. If the aboriginal hordes crossed from Asia to America, a journey entailing but very little difficulty, what would prevent their having been in contact with populations initiated into the theogony of the Jews and the principal points of their wonderful history? It is well known that the world-wide dispersion of that nation does not date from the destruction of Jerusalem by the Romans. Clannish as they are, the Jews have, from time immemorial, been more or less cosmopolitan. Even before the famous Babylonish captivity, they were to be found throughout the larger part of the Asiatic continent. In 719 B.C., Salmanassar, king of the Assyrians, had transported the inhabitants of Samaria into the most remote village of Media. In 676 B.C. Assaharaddon distributed the remnant of the kingdoms of Syria and Israel over Persia, Media and the distant provinces of the East. Dispersed after the captivity of Babylon over the whole of the then known Asia, the Israelites of the ten tribes proceeded in numerous caravans to Persia, India, Thibet and even China. Their first migration into the latter country appears to have taken place over 2000 years ago under the dynasty of the Khars. They numbered

[1] See first part of third legend.

70 families, all of the same name, which were soon dispersed into several cities, even in Peking[1]. At length, according to Strabo, who wrote in the days of Pompey and Caesar, "the Jews were scattered into all the cities, and it was not easy to find a spot on earth which had not received them and where they were not settled."

Speaking only of Asia, we find that in 878 of the Christian era, Hoang-Tchas, the founder of a Chinese dynasty, having taken the town of Kahn-Fou, which had shut its gates against him, he put to the sword 120,000 of its inhabitants, among whom Jews and Christians are mentioned.[2]

Describing his vast dominions, the famous and somewhat enigmatic Prester John said in his letter addressed in 1165 to the emperor of Constantinople, and regarded by some as authentic: "Beyond that river are ten Jewish tribes who, although they choose their own kings, are nevertheless the slaves and tributaries of our Excellency[3]."

The great Kublai-Khan, though a Buddhist by religion, is reported to have been tolerant towards all creeds, notably that of the Jews. He said that there were four great prophets, Jesus Christ, Mahomet, Moses and Chakia-Mouni. His army, which was composed of troops from all the countries that paid tribute to him, counted Jews and Mohammedans who were numerous enough to be constantly mocking the Christians. Now his empire comprehended the whole of China, Corea, Thibet, Tonquin and Cochin-China, a great part of India beyond the Ganges, many islands of the Indian Ocean, and the whole north of the continent of Asia from the Pacific to the Dnieper.

Lastly, André de Pèrouse wrote in 1326 that in the empire of the great Khan, one of the latter's successors, there were men of all nations under the sun, adding that among the Jews no conversions had been made[4].

Now, as the Biblical traditions accompanied the Jews in all their migrations, and as the latter were then, as they are now, very tenacious of their faith, if there were anything to be surprised at, it would be that after this, people should manifest surprise at finding among the Asiatic nations, and through them among the American aborigines, Biblical reminiscences either in their customs or in their mythology.

But I am drifting on to slippery ground. This is not the time to seek

[1] M. d'Escayrac de Lanture, quoted by *La France Juive*, by Ed. Drumont, Vol. I., p. 47.

[2] Christianism in China, etc., by the Abbé Huc, Vol. I., p. 85.

[3] *Ibid*, p. 93.

[4] Wadding, *Annales Minorum*, Vol. VI., p. 56.

out the origin of our Indians; let us return to our legends. I have said that our Dénés seem to be of mixed blood; the following myth will perhaps strengthen us in that opinion.

III.—MADE CELESTIAL.[1]

Told by Zacharie Nusthel (Wolverine), of Stella.

A təneza'[2] had a daughter, and she was a virgin[3]. He made her pass every night quite close to his pillow, for he was rearing her with the greatest care. Many a young man asked for her[4], but in vain: her father would not part with her.

Now it happened that on several nights the maiden awoke suddenly and then was aware that somebody was getting away from her. She wanted to know who it was; she guessed indeed that she was being abused during her sleep. Therefore she filled a little satchel with vermilion and placed it near her pillow. The following night she threw the vermilion at her violator before he had time to get out of the lodge. On the morrow, she inspected all by herself a crowd of young men who were playing at the end of the village[5], but all to no purpose. As she was returning to her father's habitation, she noticed an old snotty dog spotted on the shoulders with her vermilion. Her heart was exceedingly sorry at seeing this. At the same time she became conscious of having conceived, and after a while people knew that she was pregnant.

Therefore her father, being a nobleman, prepared a lot of tanned skins. Laid one over another, they formed a pile as high as the width of one's hand. These were to serve as a bed for his daughter's delivery[6] and afterwards to be distributed to his fellow-villagers to celebrate[7] the birth of his grandchild.

After a short period of pregnancy, as short as that of dogs, the girl was delivered of four little ones, all dogs, three males and one female. Their

---

[1] This is a rather free translation of its Indian title: *ya-'ké-nintil*, "they arrived on the sky."

[2] Or hereditary nobleman. See "The Western Dénés," Proceedings Can. Inst., Vol. VII.

[3] *Sak-ɔ̄sta*, lit., "she is sitting alone." The virginity of such persons had nothing very meritorious in itself, as it was all but voluntary. It consisted simply in constant seclusion enforced *nolens volens* on the girl by the parents.

[4] *Ɉane ʌiɣa-ɔtin*, *i.e.*, wanted to marry her.

[5] Carrier villages consisted very generally of a single row of lodges terminated by the funeral posts, the ground of which served at the same time as campus or play-ground.

[6] Illegitimate births were not looked upon by Carriers with the same degree of shame as they now inspire.

[7] Or atone for. See "The Western Dénés," Proc. Can. Inst., Vol. VII., p. 164.

grandfather was so mad at this that he tore the dressed skins off from under them and cast them in the fire. Then he packed all his belongings and, going away together with his wife, he abandoned his daughter. All the inhabitants of the village did likewise, and they migrated to a distant country; for they were too much ashamed. Moreover, to cause the death of the woman and of her little dogs, they carefully extinguished the fire of each lodge[1]. But an old woman there was who thought herself unable to undertake a long journey. She succeeded in snatching away by stealth a firebrand, which she concealed until all had left. This fire prevented them from dying of cold and hunger.

Shortly after she had been abandoned, the mother of the little dogs heard a slight noise as of the gnawing of a piece of wood. She soon perceived that a rabbit had made a hole in the board wall of the lodge. A like hole was afterwards made by rabbits at each of the other walls. At each of them the mother set a snare wherewith she soon caught plenty of rabbits. Their flesh she ate herself, and with their skins she made blankets for her little ones. The latter grew up very fast, and they seemed to be very fond of play.

Now it happened that their mother left one day to gather at some short distance bear-berries[2] for the family. When she got back, she saw on the floor of the lodge many human foot-prints, and perceived that the whole house was full of dust as if a dance had been in progress. She was very much surprised at this. So she set her mind upon discovering who had made the foot-prints. Therefore, she left again as usual to pick up bear-berries. But once arrived at the place where the fruit was abundant, she disposed her blanket as a mannequin, which she laid up against a stump. She wanted thereby to deceive her little dogs and make them believe that she was still at the berries.

Meantime she returned by a round-about way to the lodge. She surprised the little ones dancing without their dog-skins, while their sister was keeping watch over the mannequin. By a rapid movement, their mother seized the skins of the three dogs now become boys, and threw them in the fire. Their sister-dog had come out of her skin as far down as the waist only; she had time to re-enter it before her mother could snatch it away from her. Therefore, she remained a she-dog forever. "Then you are men after all, and yet it is on account of you that I have become so wretched!" exclaimed their mother as she burned their spoils.

[1] The fire-drill or *ten-tij* was known to the primitive Carriers, but the critical condition of the mother and the degree of decrepitude of the old woman rendered its preparation and use impossible.

[2] Vulgarly called kinnikinik (*Arctostaphylos uva ursi*).

She then made the three brothers a wooden arrow and began to exercise them to the hunt. Therefore they went out with their sister, who henceforth was to act as their hound. She was soon heard barking at a grouse. But her brothers knew not what to do. So they dispatched one of themselves to their mother for advice and directions. "Mother," said he, "our little sister-dog[1] is barking at something perched on a tree. It is all grey, covered with feathers and down, and looks down at us. What is it, and what shall we do with it?" Then his mother answered, saying: "My son, this is what we call a bird. It is good to eat. Let them kill it with their wooden arrow." Thereupon her son ran back to his brothers, who shot the grouse, after which they killed great numbers of like fowl.

Their mother next made them a stone-tipped arrow, and again sent them out hunting. Soon thereafter, one of them came back to consult her in the name of his brothers. "Mother," he said, in arriving, "our little sister-dog is barking at something with short ears and grey neck. What is it, and what shall we do with it?" Then his mother answered, saying: "My son, this is what is called a fisher. Its fur is used to make blankets with. Let them shoot it with their stone-tipped arrow." This they did, and subsequently they killed large numbers of similar animals.

Another day that they had gone as usual on a hunting expedition, one of them came back to consult again their mother, saying: "Mother, our little sister-dog is barking at something long; it is grey all over and has a short nose and a rounded head. What is it, and what shall we do with it?" Their mother made answer thus: "My son, this is what is called a lynx. Its skin is that wherewith blankets are chiefly made. Let them kill it with their arrow." They shot it, and afterwards many an animal of the same kind.

Another day one of them came back again from the chase to take advice from his mother. "Mother," he said, "our little sister-dog is barking after something which is big, very black and has no tail. It is grunting at us. What is it, and what shall we do with it?" Then their mother answered: "My son, this is what is called a bear. Its flesh is good to eat. Let them shoot it with their arrow." They killed it, and thereafter a great number of bears.

Still another day they sent one of themselves to consult their mother. He said to her: "Mother, our little sister-dog is barking at something very big and all grey. It seems very bad-tempered and angry, as it is constantly rushing at her; but she is so swift-footed that she successfully avoids it. What is it, and what shall we do with it?" "This must be a

[1] *Netis-jit'sé*, our younger sister-dog, in the same sense as Jacob was Esau's junior.

grizzly bear, my son," said his mother. "It is also occasionally eaten. Therefore let them kill it." So they did, and thenceforth they killed great numbers of those animals.

Another day that one of them had returned from the chase to take advice from his mother, he said to her: "Mother, our little sister-dog is pursuing an animal which has long legs and on the head something resembling the upright roots of a fallen tree[1]. What is it and what shall we do with it?" Then she made answer thus: "My son, that animal is called a caribou. Its meat is very good, and its skin serves to make moccasins with. Let them shoot it." Therefore they shot it, and afterwards many more caribou.

Lastly, one day that one of them was again consulting his mother, he said to her: "Mother, our little sister-dog is chasing a very large animal not unlike the caribou, but bigger. What can it be and what to do with it?" Upon which his mother said in answer: "My son, this is what we call a moose. Its flesh is excellent, and its skin is also very useful. Let them shoot it." After they had shot it, they also killed many more moose.

They were now exercised to hunt all kinds of animals, and they had grown to be young men and successful hunters. In recognition of the service rendered their mother by the old woman who had preserved fire for her at the time that she had been abandoned, they used to present her, after each hunt, with the fat of the animals mixed with their blood. One day that they wanted to fool her, they mixed pieces of rotten wood with blood and offered the whole to her, saying: "Grandmother[2], fry this fat mixed with blood which we give you as is our wont." The old woman did as she was bid, but she soon detected the fraud, upon which she exclaimed: "*Pəssa! ya 'téh 'gènuhtij!*[3] Oh! may you be translated up to the sky!" For she was indeed very angry.

Now it came to pass that a short time afterwards their sister-dog scented a herd of caribou. They set at once in pursuit of the game. Far, very far away they ran on the tracks of their sister-dog, and yet they could not catch up with her. The more they advanced, the higher up they were going. At length, after a very long chase, one of the three thought of sitting down to rest awhile. Looking back, he discovered that they had reached the sky, and then he was terrified indeed. He

[1] *Raz*, a primary root, means all that.

[2] In the Déné legends, the old women are always addressed as grandmothers.

[3] Archaic form of words in the Lower Carrier dialect. *Pəssa!* has no modern equivalent and is expressive of spite and rage.

told his brothers and they looked down. Then they also felt their hearts falling down at this. After a little time, they held consultation together as to the best means of returning to the earth. Then, on the advice of the eldest but one, they dropped down the little packages of dried salmon[1] which each of them had carried so far as provisions for the journey. They hung underneath a grey jay, and carefully cautioned the bird not to look up until they had all got back to their country. They expected to be taken down to the earth along with the flying bird. But the jay could not resist the temptation of taking a look at the salmon which he considered as his prospective prey. Therefore the whole assemblage of the three brothers with their packages of salmon underneath was fixed forever in the sky, men and salmon being changed into stars.

These we now see every clear night. The three brothers we call *Em'tɔ̨* or the Pursuers[2]. Their sister underwent a like transformation, and we can also see her a short distance off under the shape of a solitary star. Ahead of the whole is *Sɔmt̨nu*[3] which is nothing else than the herd of caribou chased by the three brothers. Those stars are always scintillating as if constantly on the move. This is because the caribou are fleeing from the three brothers. In a straight line beneath the hunters are three smaller stars; they are the packages of salmon changed into stars by the curiosity of the jay. As for the bird, he flew away, and therefore he cannot now be seen.

When the mother of the three brothers and of the she-dog saw that the sun had disappeared below the horizon without their coming back, she became very anxious; for they used to return home by daylight[4]. At last, having accidentally looked up to the heavens, she beheld them there stationary under the form of stars. Mad with sorrow and guessing that this was due to the witchcraft of the old woman, she ran out to her and loaded her with a coiled-root basket[5] full of burning coals which she placed on her back, constantly to pack thereafter. Then she thrust a roasting-spit through her and hurled her up to the East, saying, "Henceforth you shall be she after whom daylight comes[6]." The old woman

[1] The daily bread of the Carriers.

[2] Orion.

[3] The Pleiades. Their Carrier name is an old word, the nearest equivalent of which would be "star island."

[4] In Carrier legends, hunters are very generally supposed to return before night, unless they meet with some accident.

[5] There are no such baskets among the Carriers, but they are very common among the Tsiɬɬoh'tin, the southern neighbours of the sub-tribe to which my narrator belongs.

[6] *U'kwe-yɔɬɬaih oñlé.* The morning star.

was thus translated up to the sky, and she it is whom we see every morning under the shape of a big star. Her basket full of burning coals explains how it is that the star is so bright.

COMMENTS.

I think that it requires but little acumen to perceive the difference which exists between the present and the preceding stories. The purely mythic character of the one is as clear as the legendary complexion of the others. This remark applies more especially to the second part of the latter narrative, which is altogether mythic or fabulous, while the episode of the procreation of the hybrid brothers and sister might perhaps be regarded as figurative of the mixed origin of the Dené stock. Unless we choose to see in the representative of the canine gens and its nocturnal visits to the maiden a counterpart of the Incubus, the male demon who was formerly believed to consort with women in their sleep. But the first hypothesis is much more probable and natural. Taken as a whole and compared with the other American, and some Asiatic, races, the Dené nation is of a relatively moral disposition, and the monstrous union of the virgin with the old dog might be taken as symbolical of the former intermarriages between the original ancestors of the Dené, whoever they may have been, and some immoral and dissolute race either in Asia or on the coast of America.

Indeed, a particular Dené tribe, that of the Dog-Ribs[1], owes its distinctive name to a similar traditional intercourse of a dog with a woman, and the members of that tribe believe themselves to be the offspring of that union. Shorn of a few repetitions and unimportant monologues, their story is as follows:—

A woman belonging to the tribe of the Yellow-Knives[2] was living with her brothers when a beautiful stranger came from an unknown land, whom she was made to marry, as so far she had persisted in remaining single. As she awoke during the night she was surprised not to find her husband by her side, but instead she heard a dog gnawing some bones left on the hearth. As she had no dog, she was puzzled and was curious to ascertain whence the canine had come. Fire was rekindled, but no dog was seen. After some more rest, she again awoke to hear the same gnawing in the dark, when one of her brothers threw his axe in the direction of the noise. There was a great outcry, and after the fire had been kindled again, a big black dog was seen lying lifeless, whereby she

[1] An Eastern Dené tribe whose habitat lies between Great Slave Lake and Great Bear Lake.

[2] Habitat east of Lake Athapaska.

and her brothers knew that the animal was nobody else than her husband who, man by the daytime, became dog during the night.

For her relations with the brute, the woman was abandoned, and in due course of time she bore six little dogs, which she kept in a satchel. One day that she came back from a visit to her rabbit-snares, she noticed foot-prints as of children on the hearth. Desirous of learning whence they proceeded, she attached a long cord to the lacing-string of the sack containing her little ones and, telling them that she was going again to visit her snares she left, but merely went to hide herself a short distance off behind a bush. The little dogs believing themselves alone and unseen, came out of their sack, when their mother pulled the cord, thereby closing it against three, two males and one female, who had come out transformed into boys and girl respectively. Those that remained dogs she abandoned, while the two boys became powerful hunters and, marrying their sister, were the ancestors of the Dog-Rib tribe.[1]

Here ends in the original text of Petitot what that branch of the Dénè family regards as its national legend. One particular of some sociological importance we seem justified in inferring from the above, viz.: that polyandry did not seem repulsive to the social notions of the Dog-Ribs, any more than their congeners, the Tsé'kéhne, deemed it, until a recent date, inconsistent with propriety. That the former tribe is too exclusive in its appropriation of the tale is shown by the fact that the Tsiɬɬoh'tin possess a tradition substantially the same as that just related, and all the main details of which are identical with those of the Carrier story. Among the Tsiɬɬoh'tin, the lodge is simply replaced by the *tɟizɣən* or subterranean hut, while the bear-berries of the Carrier myth are with them a species of tuberculous root, of which they are particularly fond.

The Hare Indians, another Dénè tribe[2], share with the Kutchin, the northernmost division of that exclusive family, the belief in a tradition according to which "they formerly dwelt very far away in the west and beyond the sea, in the midst of a very powerful nation among which magicians used to transform themselves into dogs or wolves during the night, while they became men again during the day. These people had taken wives from among the Dénè[3]." The Kutchin describe that nation as very immoral and going almost naked. According to Petitot, the same Indians believe also in the existence, on the Asiatic continent, of a nation of dog-men, the upper part of whose body they state to be that of

[1] *Traditions indiennes du Canada Nord-Ouest, par l' Abbè E. Petitot*, p. 301.

[2] Habitat: Mackenzie, Anderson and MacFarlane Rivers.

[3] *Essai sur l'origine des Dénè-Dindjiè;* Paris, 1876, p. xxviii.

a man, while the lower part is that of a dog.[1] Their name for these monsters is Tlin-akeni, which means at the same time Dog-feet and Dog-race *(fils de chien)*.

To return to our legend. It would seem as if its first part were a sort of national tradition among the hyperborean races of America, since even the Eskimo have a story which is evidently the equivalent of it. According to Dr. F. Boas, an old Eskimo was living alone with his daughter who, for a long time, would not marry. At length a dog, spotted white and red, won her affection and became her husband. By him she had ten children, five of whom were dogs and five were Adlet, a tribe of fabulous beings half-men, half-dogs. The former became the ancestors of the Europeans, while the latter were the progenitors of a numerous people[2].

As to the second part of our myth, namely, the beautiful story of the initiation of the three brothers into the mysteries of the hunt, and their final transformation into stars, it is, as far as I know, found among no other Déné tribe, except the Tsiɬɬoh'tin. But the Central Eskimo have a legend which, though strongly impregnated with local colouring, bears a close resemblance thereto. Here it is, after Dr. Boas :—

"Three men went bear hunting with a sledge and took a young boy with them. When they approached the edge of the floe, they saw a bear and went in pursuit. Though the dogs ran fast they could not get nearer, and all of a sudden they observed that the bear was lifted up and their sledge followed. At this moment the boy lost one of his mittens and in the attempt to pick it up fell from the sledge. Then he saw the men ascending higher and higher, finally being transformed into stars. The bear became the star Nanuqdjung (Betelgeux); the pursuers, Udleqdjun (Orion's belt), and the sledge, Kamùtiqdjung (Orion's sword). The men continue the pursuit up to this day; the boy, however, returned to the village and told how the men were lost."[3]

It is but natural to see savages believe in the personal nature of the heavenly bodies, when even Plato, the great philosopher, thought that the stars were as many animated beings. All the mythologies are unanimous in personifying, each according to the particular bias and the favourite avocation of the people, the constellations and principal stars of the firmament. Hence, the Pleiades, which are among the sedentary people

[1] *Ibid*, p. xxix.

[2] The Central Eskimo, by Dr. F. Boas, Sixth Ann. Rep. Bur. Ethnol.; Washington, 1888, p. 637.

[3] *Ibid*, p. 637.

of Europe the "Hen and Her Chickens," and were among the poetic inhabitants of Greece the seven daughters of Atlas, become a herd of caribou among the native huntsmen of North America. It is perhaps worth noticing, in this connection, that the Greeks believed also that the Pleiades were being pursued by Orion, the gigantic hunter who, after his death at the hands of his fair but jealous companion, Artemis, was placed among the stars together with his hound.

THE FLUCTUATIONS OF LAKE ONTARIO.

By Kivas Tully, C. E.

[*Read February 10, 1894.*]

On the 22nd of March, 1879, I read a paper on this subject before the Institute; the fluctuations were from the year 1854 to 1878 inclusive, a period of 25 years. I now propose to extend the observations to the end of 1893, an additional period of 15 years, making a total of 40 years.

The great lakes of North America are the reservoirs of the water shed which lie between 76° and 92° west longitude, and 42° and 50° north latitude, running in a diagonal or north-westerly direction, between the above parallels of longitude and latitude. Since 1878 the survey of the great lakes has been completed by the United States army engineers, and I am enabled to give more correct information with respect to the water surface and water shed of the lakes, than could have been furnished when I read the first paper.

Lakes.	Area of Water Surface. Square Miles.	Area of Water Shed. Square Miles.	Aggregate Area of Basin. Square Miles.
Lake Superior	31,200	51,600	82,800
St. Mary's River	150	800	950
Lake Michigan	22,450	37,700	60,150
Lake Huron and Georgian Bay	23,800	31,700	55,500
St. Clair River	25	3,800	3,825
Lake St. Clair	410	3,400	3,810
Detroit River	25	1,200	1,225
Lake Erie	9,960	22,700	32,660
Niagara River	15	300	315
Lake Ontario	7,240	21,600	28,840
	95,275	174,800	270,075

The levels of the mean surfaces of the lakes above the mean sea level at Governor's Island, New York, are as follows:—Lake Ontario $246\frac{6}{10}$ feet, Lake Erie $572\frac{0}{10}$ feet, lakes Huron and Michigan $581\frac{3}{10}$ feet, Lake

Superior 601 $\frac{8}{10}$ feet. The difference of 20½ feet between lakes Superior and Huron, occurs in the rapids of St. Mary's River; the 8 $\frac{4}{10}$ feet between lakes Huron and Erie, mainly in the Detroit River. The difference of 326 feet between lakes Erie and Ontario occurs in the vicinity of Niagara Falls, and is principally grouped as follows:—100 feet in the five miles of rapids between Lewiston and the lower suspension bridge, 10 feet in the rapids between the bridge and the Falls, 160 feet at the Falls, 50 feet in the rapids immediately above the Falls, and six feet in the Upper Niagara River.

The mean depth of Lake Superior is about 475 feet, the deepest point marks a depth of 1008 feet, or 406 feet below the level of the sea. Lake Huron has a mean depth of about 250 feet, and a maximum depth of 750 feet. Lake Michigan has a mean depth of 325 feet, and a maximum depth of 870 feet. Lake Erie is comparatively shallow, having an average depth of less than 70 feet, and a maximum depth of 210 feet. Lake Ontario has a mean depth of about 300 feet, and a maximum of 738, or nearly 500 feet below sea level. The channels of the rivers connecting the lakes seldom exceed 50 feet. According to the U. S. lake surveys, the mean annual rain and melted snowfalls of the several lake basins are as follows:—Lake Superior, 29 inches; Lake Huron, 30 inches; Lake Michigan, 32 inches; lakes Erie and Ontario, 34 inches. This is about equal to 31 inches on the entire lake basin. The following represent the average discharges at the outlets of the lakes:—

Lake Superior at St. Mary's River,	86,000	cubic feet	per second.
Lakes Michigan and Huron at St. Clair River,	225,000	"	"
Lake Erie at Niagara,	265,000	"	"
Lake Ontario at St. Lawrence River,	300,000	"	"

"It is well understood that the principal factors on which the stage of water in the great lakes depends, are the rain and snowfalls, the evaporation, and winter temperature; the rain and snowfalls furnish the supply, the evaporation withdraws a part before it reaches the mouths of the streams, and form the surfaces of the lakes; a severe and continued cold winter preventing the melting of the snow, will raise the summer stage at the expense of the winter stage. The region of the great lakes is so vast that the conditions of rainfall, evaporation and temperature may vary widely in different sections."

The following is a detailed statement of the rain and snowfall from 1854 to 1893, and the highest and lowest water on Lake Ontario:

	Inches.	Highest Water.	Lowest Water.	Remarks.
1854—Rain and snowfall—	32.815	June 21, 36½"	Dec. 29, 6"	Great fall
1855 "	41.550	Aug. 7, 29¾	April 2, 1	Water rising
1856 "	27.055	June 11, 32½	Dec. 15, 4½	" falling
1857 "	40.585	July 27, 43½	Jan. 30, 1½	Great rise
1858 "	32.591	" 13, 44	Nov. 30, 17½	Water steady
1859 "	39.764	May 31, 43	" 14, 12½	Great fall
1860 "	27.994	July 8, 24½	" 24, 11	Rise and fall equa
1861 "	34.475	June 5, 39	Jan. 30, 9	Great rise
1862 "	34.009	May 21, 43½	Dec. 19, 8	Great fall
1863 "	32.773	" 16, 34½	" 15, 8	Rise and fall equal
1864 "	36.946	June 5, 35½	Feb. 16, 4	Great rise
1865 "	32.929	May 19, 30	Dec. 27, zero	Great fall
1866 "	39.419	June 18, 20	Feb. 15, – 7	Water kept even
1867 "	30.091	" 17, 38	Dec. 26, – 5	Great fall
1868 "	34.278	July 1, 17	Feb. 6, – 12	Low water
1869 "	39.642	" 28, 27	" 5, – 2	Water rising
1870 "	46.188	May 6, 47	Dec. 29, 12	Highest water
1871 "	32.731	" 4, 26	" 29, – 6½	Great fall
1872 "	25.338	June 22, 3¼	Mar. 19, – 16¼	Lowest water
1873 "	31.612	May 26, 23	Jan. 9, – 15	Great rise
1874 "	24.344	June 11, 29	Dec. 30, – 5	Fall at end of year
1875 "	29.730	" 24, 12	Feb. 17, – 15	Very steady
1876 "	32.403	July 5, 41	Jan. 10, – 2	Great rise
1877 "	25.615	April 28, 18½	Nov. 18, – 1½	Low water
1878 "	48.490	Dec. 14, 25	Jan. 5, – 1	High water
1879 "	29.365	Jan. 1, 22	Oct. 30, – 6½	Gradual fall
1880 "	35.322	June 4, 19	Dec. 30, – 7	Rise and fall equal
1881 "	26.898	July 8, 15	" 7, – 7	"
1882 "	24.838	June 30, 29½	Jan. 3, – 3	"
1883 "	34.134	July 16, 36	" 21, – 2	"
1884 "	28.552	May 22, 40	Nov. 24, 9	High water
1885 "	32.911	Aug. 3, 34	Mar. 10, 4	"
1886 "	35.076	May 10, 46	Nov. 15, 14½	"
1887 "	25.759	" 30, 39	Dec. 29, 3	Low water
1888 "	26.279	June 28, 17½	" 21, zero	"
1889 "	31.225	July 3, 22	Nov. 4, – 1	"
1890 "	37.370	June 21, 37	Jan. 8, 8	High water
1891 "	31.515	May 2, 29	Dec. 16, – 13½	Very low.
1892 "	29.505	July 24, 14½	Mar. 7, – 13½	"
1893 "	39.715	June 1, 27	Feb. 7, – 9	"

NOTE—Where the sign – (minus) is used it indicates level below zero. Zero was established in 1854, being 9 feet above the surface of the rock at the Queen's Wharf.

The observations as to the level of the water in Lake Ontario were commenced by the directions of Capt. Richardson, Harbour Master, in 1854, though a regular float gauge was not constructed until 1856, and since that time the gauge has been four times shifted, care having been taken to preserve the datum. I can personally vouch for the correctness of the observations, having occasion to refer to them constantly as Harbour Engineer since 1853, a period of over forty years.

In the paper which I read at the Institute in 1879, it was stated that the average rain and melted snowfalls for 25 years were 34.172 inches, the highest being 48.490 inches in 1878, and the lowest 24.344 inches in 1874. The average rain and snowfalls for 15 years, from 1878 to 1893, were 31.217 inches, the highest being 39.715 inches in 1893, and the lowest was 24.838 inches in 1882. The extreme fluctuations of Lake Ontario between the years 1855 and 1878 inclusive, were in 1870, when the highest water was reached on the 6th of May, 47 inches, and two years afterwards the lowest water occurred on the 19th of March, 1872, 16¼ inches, an extreme of 63¼ inches. The extreme fluctuations between the years 1878 and 1893 were in 1886, when the highest water was reached on the 10th of May, 46 inches, and in 1892, not quite six years afterwards, the lowest water occurred on the 7th of March, 13½ inches, an extreme of 59½ inches, nearly four inches less than the extreme fluctuations for the previous 25 years. The mean average for the 25 years was 18.20 inches, and for the 15 years, between 1878 and 1893, was 15.17 inches. The diminution of nearly three inches in the rain and snowfalls, and more than three inches in the fluctuations of the above periods, induced me to examine the average rain and snowfalls, as recorded by the Meteorological Observatory, and I find that the above observations have been substantiated, as follows :—

In 1858	the average of	17	years was	36.940	inches.
1868	"	27	"	36.273	"
1878	"	37	"	35.464	"
1888	"	47	"	34.632	"
1893	"	50	"	34.338	"

Showing a gradual diminution of 2.602 inches in 50 years.

The cause of this diminution is not far to seek. The reckless destruction of the forests in Ontario, also Michigan and Wisconsin in the United States, by lumbering and consequent fires, in the area of the water shed of the great lakes, without a partial or corresponding substitution of trees by planting, is a sufficient explanation of the result, apart from other probable causes.

The Ontario Government took the initiative, some years since, in es-

tablishing a forestry branch, in connection with the Crown Lands Department, to induce farmers to plant trees, partly to replace the wholesale destruction of the forests, which has been continued for over a century, and the annual reports indicate that some progress has been made in this most important and urgent matter, affecting as it does the prosperity and welfare of the province.

The establishment of the Algonquin Park by the Ontario Government last year, the Banff Park by the Dominion Government, and the Adirondack and Yellowstone Parks in the United States, are indications of the interest that is now taken in this matter by the Ontario, Dominion, and United States Governments. I am not aware that the United States Government has taken any steps to second the efforts of the Ontario Government to rectify the evil effects of the destruction of the forests, by means of planting, etc. It would be interesting to know what the average rain and snowfalls were in the beginning of the present century as compared with the present average; the records would probably show a difference of six inches.

The diminution of the average mean water level of Lake Ontario, three inches in 15 years, affects the shipping interests, as there is so much less depth of water in the harbours round the lake, a constant source of complaint. The chart prepared by Mr. Crosman, of Milwaukee, shows the fluctuations of the great lakes from 1859 to 1887. The chart showing the records of the rise and fall of Lake Ontario is copied from the original in the Harbour Commissioner's office, Toronto; also the annual and weekly records from 1854 to 1893.

The records of extraordinary fluctuations are limited to four instances, though several have been noticed, two of which were observed at Oswego in 1872 and 1873, by officers in charge of the United States survey of the lakes, and two at the Queen's wharf, Toronto, one on the 24th of April, 1878, and one on the 17th of April, 1880. The records are as follows:—"On the 13th of June, 1872, at Oswego, between 2 and 3 p.m., the water suddenly rose one foot in ten minutes, and afterwards continued to rise and fall until 7 o'clock, the barometer falling nearly all the time. At ten minutes past 3 a white squall and water spout passed about one and a half miles to the north-west and moving west. At Olcott, 112 miles west of Oswego, the people reported having seen an immense sea serpent lashing the waves, which was presumed to be the water spout before noted." Again at Oswego on the 19th of July, 1873, it was observed:—"At 3 o'clock the barometer had fallen .05, the water to $2\frac{4}{10}$ feet, and the thermometer was 76°; at 5 p.m. the water suddenly rose to $3\frac{4}{10}$, it was found that the barometer had fallen .07, the wind had

shifted to the south-west, and the thermometer had risen to 80°. At five minutes past 5 the water had fallen again to $2\frac{4}{10}$, the wind shifted to the north, blowing fresh, and a water spout appeared about four miles N.N.W., moving S.S.W." General Comstock remarked in reference to these reports:—"It would seem, then, from the consideration of the irregular fluctuations at Milwaukee, Marquette and Oswego, that a probable cause is to be found in the oscillations of the barometer, either local or general, and in the accompanying winds, periodically arising in some cases by reflection from the opposite shores."

The unusual fluctuations at the Queen's wharf, Toronto, in 1878 and 1880, are noted as follows:—Capt. Paul, in charge of the Dominion Government dredging, stated in his diary, April 24th, 1878: "A.M., cloudy, threatening, wind fresh, east; P.M., heavy squall from the S.E. with rain. Extra rise and fall of water 3½ feet above the average. Normal state of water 20 inches above zero. On the 23rd the level was 19, and 25th, 20 inches above zero." The time was not stated, but he informed me shortly after the occurrence that it was in the afternoon. Mr. Carpmael, now superintendent of the Meteorological Observatory, kindly furnished me with the barometric readings for that day. "Between 1.58 p.m. and 2.02 p.m. there was a sudden rise of more than a tenth of an inch, viz.: from 29.122 to 29.226, in less than four minutes." Mr. Carpmael, who lectured at the Institute shortly after that time, mentions in his notes on the above: "At about 2 h. 2 m. the wind suddenly increased in force and veered from east to south, afterwards returning to S.E. and E., the force at the same time diminishing." There were no reports of water spouts or sea serpents. In reference to the second fluctuation, the Toronto *Globe*, April 19th, 1880, stated: "About 5.45 p.m. on Friday last (17th inst.), a tidal wave set into the harbour, when the water suddenly with one great advancing flood raised about twenty inches. The height of water was maintained, ebbing and flowing for about an hour. The wave appeared to come in from the south, where the sky at the time gave the appearance of a heavy squall." With reference to the supposed tidal theory, General Comstock remarks: "The known existence of a lake breeze at Milwaukee during the summer months, at once suggested itself as a cause for this inequality, and on comparing the solar diurnal curves for April and November, when the lake breeze should be weak, and that for July and August, when the lake breeze should be the strongest, with that of the whole season, it was found that for the former months the inequality nearly disappears, while for the latter it is considerably increased, thus justifying the supposition that the lake breeze is the cause of the inequality." On such evidence the so-called tidal

theory may be dismissed, so far as regards the apparent effects on lake fluctuations.

The extreme fluctuations of Lake Erie, or the difference between the records of the highest and lowest water at Port Colborne, between 1859 and 1867, were 11 feet 3 inches, and the extreme fluctuations of Lake, Ontario, at Port Dalhousie between 1868 and 1870, were 6 feet 11 inches, and according to the records in the Harbour Commissioner's office, Toronto, between 1870 and 1872, were 5 feet 3¼ inches, as before explained in reference to the fluctuations of Lake Ontario. Extreme fluctuations on lakes Superior, Michigan, Erie and Ontario have been referred to by newspapers and periodicals in the United States and Canada, but as the fluctuations were not particularly recorded, or accurately substantiated by reliable observations, as in the above-mentioned instances at Oswego and Toronto, I have not considered it advisable to give an account of them in this paper.

THE GESTURE-LANGUAGE OF THE BLACKFEET.

BY REV. JOHN MACLEAN, PH.D.

[*Read 3rd March, 1894.*]

The gesture-language of the Blood Indians is the same as that belonging to the Piegan and Blackfoot Indians, the whole comprising the Confederacy. My first observations among the tribes of the Canadian North-West induced me to conclude that the gesture-language was similar amongst all the tribes, but later studies among the Crees, Stonies and Sioux have compelled me to change my opinion. I found during visits made to the camps of these people that I could talk with them about time-measurements, and was able to count by signs, but I was unable to converse with them of matters relating to daily life. Distinct from the gesture-language proper, there exist several methods of communication, as by the arrangement of fires on the prairies in times of war or when travelling, the various modes of the curling smoke being used to convey different messages, and piles of stones on the prairie marking distances or indicating some notable event. The Indians' system of telegraphy includes different modes of riding on horseback, motions of blankets and the use of looking-glasses.

The gesture-language is spoken in general by means of the hands. The gestures representing the various tribes are as follows:

Blood Indians.—The forefinger and second finger of the right hand are brought together and held open, while the hand is closed. These are pushed forward under the lower lip, horizontally across the chin.

Piegan Indians.—The right hand closed, and placed against the right cheek at the top of the cheek bone, with closed thumb touching the cheek. The fist is made to rotate rapidly and outward upon the cheek.

Blackfoot Indians.—The two forefingers of the right hand erect and apart in the shape of a V and the rest of the hand closed. Holding the body erect, the fingers are pushed downward and outward over the right foot, as if in the act of scooping mud off the foot.

White Men.—The forefinger of the right hand drawn horizontally across the forehead, in the centre of the brow.

Sioux Indians.—The forefinger of the right hand drawn across the throat, as if in the act of cutting the throat.

Sarcee Indians.—The forefinger and thumb brought together at the tips, then raised to the right hand corner of the mouth, and made to operate as a person would do in taking a pinch of some fine powder and then rubbing it between the fingers.

Crow Indians.—Both hands raised by the sides palms downward, and raised up and down several times to represent the flapping of a bird's wings.

Gros Ventres.—Fall or Willow Indians, known amongst the Blackfeet as the *Atsinas*.

The tips of the fingers brought together below the chest, palms of the hands open and toward the body, then pushed outward and downward to represent corpulency.

These gestures do not always correspond with the name of the tribe, but in general describe some characteristic of the people.

In the modes of reckoning time, the measurements are made by the right hand. The forefinger of the right hand is bent, and held toward the sun, to mark where it stood at the time indicated. Thus the hand with the finger bent begins at sunrise and goes round marking each distinct position, and the hour of the day is measured in this manner. These Indians, like many other tribes, use the term "nights" where the white people use "days".

In counting, both hands are used. The forefinger of the right hand is brought into contact with each finger of the left hand separately in counting units.

Tens are counted by holding up the hands and opening and closing them as often as *tens* are in the number. Another method is to run the forefinger of the right hand horizontally across the fingers of the left hand. Thus to reckon fifty, both hands may be opened and closed five times, or the right forefinger drawn across the thumb and fingers of the left hand in the manner indicated.

In describing a hunt one set of gestures is used, applicable especially to this kind of life.

Buffalo are represented by lifting the hands to the side of the head and raising the forefinger of each hand to indicate horns.

Shooting is indicated by bringing the palms of the hands together, the right hand being uppermost, and quickly striking the centre of the palms, at the same time making a noise with the mouth as if a number of rifles were being fired in succession.

Looking through a telescope is expressed by holding the hands to the eye, finger and thumb of each hand brought together at the tips, forming a circle, the right hand being nearest the eye, and then looking through them.

An animal being shot and falling to the ground is shown by holding the palms of both hands toward the ground, and throwing them down a few inches.

Scalping.—The left hand holding an imaginary scalp-lock, and the right hand performing the act.

War-cry.—The right hand held over the mouth, striking it quickly in succession, at the same time uttering a most unearthly cry, which is never forgotten by those who have ever heard it.

Surprise.—The palm of the right hand held over the mouth, while the eyes express astonishment. Sham fights are engaged in during the Sun-Dance, in which many of these gestures are used. There are a large number of miscellaneous gestures, some of which can be explained in words, but others cannot be accurately described except by actual representation with the hands.

Nistoa = I.—Is represented by placing the forefinger of the right hand upon the nose, having the hand closed and turned toward the face.

Moyis = A lodge.—The hands held upward as if in the attitude of prayer, palms toward each other, and tips of fingers touching one another.

Aiksoo = It is finished.—The end of any work or contract, or the dissolution of a bargain, as much as to say, "there's an end of it." The hands are closed, and held in front of the body, then brought together until the thumbs touch each other, afterward separating them quickly, resembling the motion of a shoemaker in sewing.

Mis-amoi = A long time ago.—The left arm held out from the body, and the forefinger of the right hand pointing toward the left arm, drawn up the left hand toward the shoulder.

Saiapetsio = He is speaking falsely.—The right hand held toward the face with palm inward and open, the fingers pointing upward, and then a quick motion from left to right as if trying to cut off the nose. Another form of this expression is to bring the two forefingers of the left hand to the mouth, separated in the shape of a V, and pointing outward to represent a forked or doubled-tongued person. A deceitful person is represented by the right hand being held in front of the body palm open and downward, and the hand tipped first to one side and then to the

other, as if the heart were swaying and was undecided, and therefore not to be depended upon.

Aipoyeo=He is speaking.—The right hand palm upward brought toward the mouth with the fingers pointed outward, until the edge of the hand touches the lower lip, then carried forward from the mouth in a trembling manner, as if carrying the words separately and throwing them out after each other.

Pistceksena = A snake.—The forefingers of the right hand held horizontally and pushed outward with a zig-zag motion made resembling the motion of a snake in crawling.

Awaseneo = He is weeping.—The forefingers of both hands held toward the eyes and drawn downward several times, representing tears coursing down the cheeks.

Friendship is expressed by joining the hands together and shaking them, as a person does in shaking hands with another person. This appears to have been learned from the white people.

Kĭtûkomimo = I love you.—First the sign for *Nĭstoa* is used, then both hands are pressed against the left side in token of endearment, and finally the forefinger of the right hand is pointed toward the person loved.

Kika = Wait.—Desiring a person riding on the prairie to wait, the Indian holds his right hand open above his head, and then with the fingers pointing upward, the hand is shaken backward and forward while the arm is held firmly in position.

Nĭtŭqpuma = I am trading.—The left arm bent, hands shut and bent toward the body, the forefingers of both hands extended, the forefinger of right hand placed on top of the left forefinger in the form of a cross.

Nomûqpûpe = My blood-relation.—The points of the fingers of the right hand brought together, the tips touching the breast, and then drawn out, representing the act of nursing.

Nĭtaikimatapsi = I am poor.—The left hand closed, forefinger extended and held toward the body, the right hand closed with forefinger extended and placed upon the left finger, and finally a quick motion repeated by the right forefinger upon the left forefinger toward the finger as one does in sharpening a pencil.

Noqkokit = Give it to me.—The right hand open, palm toward the body, and a motion made as if drawing goods toward the person.

Aoûqseneo = He is eating.—Both hands held half open toward the

body, and a quick motion made representing the act of throwing articles into the mouth.

Nimataioqtciqp = I do not hear it, I do not understand it.—The forefinger of either hand bent, and held toward the ear on the same side as the hand, and then the finger jerked toward the centre of the ear. Another mode of expressing the same idea is to hold the palm of the hand toward the ear with the fingers half bent, and then to throw outward the whole hand.

Being born, or the time of our birth is represented by the left hand being held palm downward, thumb toward the body, below the chest and close to the person, the right hand palm downward, fingers pointing outward from the body, and the whole right hand pushed under the left hand and outward from the person.

Anom = Here, this place.—The end of the closed fist of the right hand placed on the end of the closed fist of the left hand.

Riding horseback is indicated by the first and second finger of the right hand being separated and placed over the forefinger of the left hand in a straddled fashion, the palm of the left hand being toward the person.

A friend of mine distant from me a mile I was anxious to converse with, but he was beyond the sound of my voice and was rapidly walking away from me. An Indian was coming toward him on foot, and seeing my opportunity I called to one of my Indian friends near me and told him to inform the Indian in the distance by means of the gesture-language that I wished to talk with the white man. Immediately he used the sign for *kika = wait*, pointed toward the white man, brought his right hand down and toward his person in a swaying motion, then closed the same hand, raised it and brought it toward the ground in a perpendicular manner. The Indian in the distance walked up to the white man, and delivered the message, who turned and came to the place where I awaited him.

The gesture-language is full of expressive signs, a few of which I have given, but a small volume could be written on this interesting subject.

THE CLIMATE OF ALBERTA.

By R. F. Stupart.

[*Read 7th April, 1894.*]

Not long since, in looking over some meteorological observations made at Edmonton, N. W. T., it struck me it would not be amiss to write a short paper on the climate of Alberta, which portion of the Dominion has, I conceive, a climate more than fairly desirable as regards mere living in it, and I trust also one that will make the country widely known for its rich farming and pasture lands; on the latter point, however, I am no expert, and am unable to speak authoritatively.

From mere hearsay and newspaper reports one may well be somewhat puzzled as to the facts concerning the climate of our great Northwest. We hear people talk of a country where 20° below zero does not feel cold, and of a country further west where lawn tennis is an amusement sometimes indulged in at Christmas, and again of howling blizzards and Arctic cold.

Meteorological observations taken at various points in the Territories during periods ranging from nine to twenty years, afford sufficient data to report with a fair degree of accuracy on the climatic vicissitudes which may be experienced, such series containing, as they probably do, seasons of extremes in both directions, one or more of which will at any rate approach the greatest ever experienced in the country.

In considering the climate of Alberta, nine years observations at Calgary and eleven at Edmonton have been closely studied and analyzed, but beyond the more detailed investigation of the climatic changes occurring from month to month, and in various years, I shall endeavour to shew how it is that this particular part of the Dominion is subject in winter to very great temperature changes in a short time, bitter cold giving place in a few hours to balmy weather under the softening influence of the chinook. A valuable and instructive paper published in the "American Meteorological Journal" for August, 1888, by Mr. C. C. McCaul, of Calgary, N. W. T., points out very clearly the wonderful effect so often produced by a change of wind from north and northeast to southwest and west, how the temperature will in a few hours jump up from 20° below zero to 40° above and a thick covering of snow rapidly disappear, and also deals very correctly with some of the conditions that produce these balmy westerly breezes in winter.

In glancing over the mean temperatures of the various winter months —December, January and February—at Calgary and Edmonton, the first thing that must strike one is the very large difference between the highest and lowest means of corresponding months in different years; for example, in 1891 the January average at Edmonton was 20.9°, and Calgary 27.0°, which former temperature is approximately equal to the Toronto normal, and the latter several degrees above, while in 1890 Edmonton shewed a monthly average of 6.8° below zero, and Calgary 3.5° below, both of which are not far from the mean at Moose Factory on James's Bay. At Edmonton, January 1886 was even colder than 1890, shewing an average of 13.7° below zero. A normal deduced from the eleven years' observations at Edmonton gives 2.7°, and the nine years' observations at Calgary give 9.4° for that station.

February means shew the same tendency to extremes. In 1889 the February mean temperature was 21.9° at Edmonton and 20.3° at Calgary, while in 1887 it was 10.4° below zero at the former station, and 4.0° below at the latter. The February normal at Edmonton is 5.4°, and at Calgary 12.0°. The December means do not shew quite so wide a range, but December 1890 shews a mean of 22.6° at Edmonton, and 25.4° at Calgary, while in 1884 it was 1.0° at Edmonton, and 3.5° at Calgary.

While at both stations the winter months are in some years excessively cold, scarcely a month goes by without one or perhaps several breaks when the temperature exceeds 40°, and at times in some months is upwards of 50°. The highest temperature registered at Calgary in January was 58° on the 23rd, 1892, and at Edmonton 52° on the 22nd, 1892.

At Edmonton, on the average out of the 59 days in January and February the temperature exceeds 32° on 17 days, and at Calgary on 23 days. On the other hand, at neither station has there been a January in which the temperature has not fallen to 20° below zero, and 57° below has been recorded at Edmonton and 48° below at Calgary.

March shews a very marked improvement in the temperature, the normal for Calgary being 26.8°, with an average maximum of 39.2°, and at Edmonton 23.7°, with an average maximum of 35.3°. The lowest March temperature recorded at Calgary was 28.7° below on the 2nd, 1888, and at Edmonton 39.5° below on 3rd in the same year.

April shews a normal of 39.3° at Calgary, with an average maximum of 52.5°, and Edmonton shews the same temperature with an average maximum of 51.5°. Scarcely a year goes by without temperatures exceeding 70° being recorded.

A comparison of these average temperatures, etc., with those of other parts of the Dominion shews that with the exception of South and Southwestern Ontario and British Columbia there is no portion of the country where the spring opens as early as in Alberta.

The mean temperature of Northeastern Ontario, deduced from observations at Lindsay, Ottawa and Rockliffe, gives a March mean of 20.7°, with a mean maximum of 31.1°, and an April mean of 38.2°, with a mean maximum of 49.0°, shewing that during both these months the weather is colder in Northeastern Ontario than in Alberta.

From May to November the temperature is lower in Alberta than in any of the more settled parts of Ontario. The warmest month is July, with a mean of 60.5° at Calgary and 58.8° at Edmonton, and a mean maximum of 74.0° and 72.9° respectively.

In some years frosts occur in early June, but by no means invariably. There is no instance recorded of the temperature at either station touching the freezing point in July. In August there are a few instances of frost, but it is uncommon.

Usually it is well on in November before the temperature falls to zero roughly speaking between the 15th and 20th.

The month of December shews much the same figures as those of Northeastern Ontario, the mean at Calgary being 17.2°, with a mean maximum of 27.4° against 17.7° in Northeastern Ontario, with a mean maximum of 25.8°. The advantage is thus with Alberta.

The total mean annual precipitation is 14.16 inches at Edmonton and 12.85 at Calgary ; of this the greater portion falls as rain between April, and September, the amount being 9.81 inches at Calgary and 10.61 inches at Edmonton, or about 67% of the amount which falls in the Northeastern Ontario district during that period.

In Alberta there is a great deal of sunshine, the annual amount of cloudiness being only about 70% of the average amount at Toronto; roughly speaking the average cloudiness during the fall and winter months is 72% and about 50% in summer, but in Alberta summer and winter months shew about the same amount, and give a yearly average of 43%.

THE CHINOOK.

During the winter months the normal atmospheric pressure conditions are anticyclonic over the interior of the continent, while over the northern portions of the Atlantic and Pacific oceans there is tolerably persistent low pressure. This distribution of pressure gives prevailing north-

westerly and westerly winds over Canada from Manitoba to the Gulf of St. Lawrence. Along the eastern slope of the Rocky Mountains they are generally northerly, but as we cross to the Pacific Coast the barometric gradient alters its direction in a way to produce a prevalence of easterly to southerly winds near the British Columbia Coast, and as we go still further west we find in crossing the Pacific south of latitude 50° a prevalence of southwesterly winds blowing from a subtropical belt of high pressure towards the low to the northward.

Now the normal low pressure area over the North Pacific is a region frequently traversed by barometric depressions or storm centres, many of which move to the coast of California or British Columbia and thence force their way into the continent, temporarily displacing the high pressure there prevalent. It is when one of these areas of depression is forcing its way inland over Northern British Columbia that the winter Chinook is felt in Alberta. Then is Alberta within the southwest barometric gradient in connection with the storm centre and southerly to westerly winds are blowing over British Columbia. These winds blowing off the sea are moist, they ascend the mountain slopes and are gradually deprived of their moisture, rain or snow falling on the mountain sides. This condensation of moisture sets free latent heat which retards the dynamic cooling due to diminished pressure, and afterwards as the dry air descends the eastern slopes it is heated by compression at the normal adiabatic rate, and the result is a mild dry wind over the Alberta prairies.

It will easily be understood from this that the character of the seasons in the far West must depend greatly on the track that storm centres take in passing into the continent from the ocean. In some seasons the majority of them pass over Northern British Columbia, and then there is a marked persistence of the mild southwesterly winds in Alberta; in other years the majority pass into the continent further south, perhaps only a few moving north of the latitude of Calgary, then is Alberta favoured with but a small quantity of balmy breezes.

When a storm centre passes over Washington or Oregon States and thence perhaps east or southeast, Alberta and the Territories, in lieu of the mild southwester, experience bitter north and northeast winds and perhaps a snowfall, and at times Vancouver Island itself is subjected to a northerly gale with snow.

ABORIGINAL AMERICAN INSCRIPTIONS IN PHONETIC CHARACTERS.

By John Campbell, LL.D., F.R.S.C., &c.

[*Read 15th December, 1894.*]

The dictum of Schoolcraft, to the effect that our aborigines had never advanced beyond the pictographic stage of writing and were ignorant of phonetic characters, has been generally accepted by those who are regarded as authorities on the subject of American antiquities. That irrational preconception, which facts traverse on every side, has led them to denounce as forgeries documentary evidence on stone, for the production of which no adequate motive has been adduced, and the genuineness of which has been attested by many credible witnesses. Discovered at different periods, by many different persons, and in regions widely separated, from Virginia to Massachusetts, and from Iowa to Nova Scotia, these documents, with variations, are all of one character, and that is intimately related to the syllabary found on many Siberian monuments. I have already in two papers, of which the Siberian alone has yet been published, furnished the Institute with samples of the northern Asiatic and kindred Buddhist Indian inscriptions. A similar task I now propose to perform for those of the North American continent.

Before proceeding with this task, however, I may say that I have already nullified the preconceived contention of Schoolcraft's followers by presenting to the Royal Society of Canada, at its meeting last May, translations of several Central American inscriptions found at Palenque, Copan and Chichen-Itza, inscriptions of a purely ideographic character, whose sole peculiarity is that the phonetic equivalents of the ideographs occasionally possess the equivocal values of the *rebus*. The Central American hieroglyphics are a form of American writing entirely distinct from that of the Mound Builders, and were derived, as Professor Cyrus Thomas at last agrees with me, from the Malay-Polynesian area. The hieroglyphics of Mexico proper, on the other hand, are to the characters of the Mound Builders as the hieroglyphics of the ancient Egyptians were to their hieratic and demotic script.

There are pictured rocks in Siberia and Japan, very similar to those found throughout America, as the latter are portrayed in the late Garrick

Mallery's Picture Writing of the American Indians. These are quite distinct from inscriptions in phonetic characters found in both areas. The authors of the phonetic inscriptions in India and Siberia were Buddhist monks, or those of them who constituted a caste of Scribes. In both countries, and the same is true of Japan, although the inscriptions of that empire yet published are too vague and fragmentary to read, the language of the documents is pure, if somewhat archaic, Japanese, a fact of which I was not aware when, many years ago, I essayed the decipherment of one of the Davenport tablets. In several communications to the Institute, I have shewn that the affiliation of most of our North American aboriginal languages, such as, to use the designations of Pilling, the Siouan, Iroquoian, and Muskhogean, are with the Sibero-Japanese or Khitan tongues of Northeastern Asia, in whose area the literary Japanese was the classical form of speech. It was also the classical tongue in aboriginal literary North America; and, even at the present day, the Muskhogean group, including the Choctaw, Chickasaw, Creek, and Seminole, furnishes a series of dialects differing as little from the Japanese as English does from German. It is, therefore, no matter for astonishment to find the Japanese of Siberia repeating itself in the records of our Mound Builders. Competent Japanese scholars, such as the Rev. Dr. Jonathan Goble, of Philadelphia, cheerfully admit that my translations of the Siberian inscriptions are idiomatic Japanese, and it is in the power of any intelligent person to test the consistency of my transliteration of the American texts, and to submit the language they yield to the judgment of experts.

A melancholy interest attaches to my task, inasmuch as most of the scholars who kindly furnished me with copies of the inscriptions have passed away out of this life. Such are Dr. Farquharson, of Davenport, Iowa; Colonel Charles Whittlesey, of Cleveland, Ohio; Professor E. N. Horsford, of Cambridge, Mass.; and Sir Daniel Wilson, of Toronto. Of my other benefactor in this respect, Professor Hilder, of St. Louis, Mo., I have not heard for a long time, but trust that he is still among us in body as well as in spirit. It would have been a great gratification to me to have had their matured judgment on my epigraphic researches, which were not sufficiently advanced to allow of my submitting the finished result to their benevolent scrutiny. This paper may have the effect of bringing to light other literary records of the Mound Builders and their descendants, which have been withheld from public gaze in order to save their innocent possessors from the odious charge of forgery, so maliciously and ignorantly brought against the finders of those that have been published.

Of all the inscriptions in Mound-Builder, or, if the term be preferred, in Siberian characters, the simplest and most legible is that on the Inscribed Rock of Yarmouth, Nova Scotia. As it has been known for nearly a century, and its genuineness, so far as I have heard, has never been called in question, it makes a fitting starting point for the epigrapher. It consists of twelve characters, that which is to the left of the V form, fourth from the end, consisting of two obtuse angles, which ought to be close together. The inscription reads from left to right. Its two V characters are *bu* or *fu* syllables; the second character is *bi* or *be*. The third, like a C, is *de;* the fourth and the last are forms of *ka*. The fifth and the last but one are equally *go* or *ku;* the sixth is *ta*, *to;* the seventh is *ra*, *ro*, *ri*, etc., any power of *r*. The eighth double character is a variant of the third, namely, *de;* the ninth, eleventh and twelfth have been already given, and there remains only the tenth, which is *chi*, *shi*. The whole reads:—

NO. I.

bo bi de ka ku ta ra de bu shi go ka

Turned into modern literary Japanese, this is:

Wabi deka Kutarade bushi goki

"Peacefully has gone out Kutarade warrior brave," or more freely, "The brave warrior Kutarade has died in peace." Kutarade is not a Japanese name, but, as "Katorats," it is Huron-Iroquois, and means "the hunter." The Japanese equivalent is *Karindo*. It would be interesting to find when Katorats lived and died, as indicating the late possession by the Huron-Iroquois of a written character and a sacred language.

The next I submit is an inscription on the Northman's Written Rock, near West Newbury, in Massachusetts. The tracing was made in 1853, and my copy of it came from the late Professor Horsford. In Siberian inscriptions, two more or less parallel lines, not always perpendicular, take the place frequently of the pair of obtuse angles which give *de*. The single straight line, however placed, is an open vowel or aspirate and the Z figure is *na* or *no* in universal Hittite script. The latter is but a square variant of an S, and the sort of crosier that follows it is also an imperfect S with phonetic value *no*. The following *m* can hardly be anything else than *me* or *mi;* then comes a vowel or aspirate, and after it a *shi*. The *w* like character is a double *bu*, *fu*, followed by an open *shi;* if it faced the other way it would be a *de*. The character that looks like a capital R is two characters in reality, that to the left being an *s* syllable, and the compound one on the right being a combination of *s*

and *t*, making *dsu*, *tsu*. After the following *no* comes *fu*; then the vowel or aspirate; then three dots before another *fu*, and two strokes which stand for the number two. In the lower line the club denotes *ta*, *to*; but what follows is without duplicate in Mound-Builder writing. It is neither Siberian nor Buddhist Indian, but in ancient Hittite, in Corean, and in Aztec script, it would be an *l* syllable, which Japanese has not. Next comes an imperfect *shi*, followed by the well-known Indian and Siberian equivalent for a fish, which is *me*, *mi*. To the right of the effigy comes another club, *ta*, *to*, and the common diamond symbol, *ma*, *mo*.

We are now in a position to read the document.

No. II.

de ha na no me ha shi bu shi se tsu no fuye 3 fu 2 to li shi me × to ma.

In Japanese this is:

Dehana no Mehashi bushi setsu no fuye 3 fu (tachi) 2 Torishime atome.

"Dehana of Mehashi warrior seasons of number 3 twenties 2 Torishime heir."

Freely: "Sixty-two (is) the sum of the years of the warrior Mehashi of the Dehana, the heir of Torishime."

Mehashi in Japanese means "the quick"; and Tolishime or Torishime is "the controller." As for the Dehana, I think they are the Tionon or Tionontates, a Huron clan; so that Mehashi, and his predecessor Tolishime, may have claimed kindred with the Nova Scotian Kuturade. The arithmetical notation is purely Siberian.

It is a long step from Massachusetts to Virginia. The Grave Creek Stone was found in 1838 in the Grave Creek Mound, twelve miles below Wheeling in West Virginia. It has three lines of writing. Beginning at the left of the top line, there appears the *ka* of the Yarmouth Stone, followed by a cross, *ta*, *to*. The third figure is *ku*, *go*; and the fourth, a St. Andrew's cross, is still *to*. Next comes the common *r* syllable, and after it a 4 which is a variant of the fish *me*, *mi*; with another *to* to bring up the rear. In the second line, the St. Andrew's cross is still *to*, *do*; the obtuse angle convex is *de*, *te*; the line is a vowel or aspirate; and the obtuse angle concave is *chi*, *shi*. This is followed by the *bi*, *be* of Yarmouth, and that by a limbed *r* syllable. The next characters are simple numerals, 2 and 3 strung in a line. The third line presents *bu* or *fu*; then a cross with a short line attached. The cross is *ta*, *to*, and the line is the vowel or aspirate. The *r* syllable follows; then comes *mi*, *me*; and the next character is a combination of the vowel sign with a *ts* form.

PLATE I.—THE MOUND BUILDER SYLLABARY.

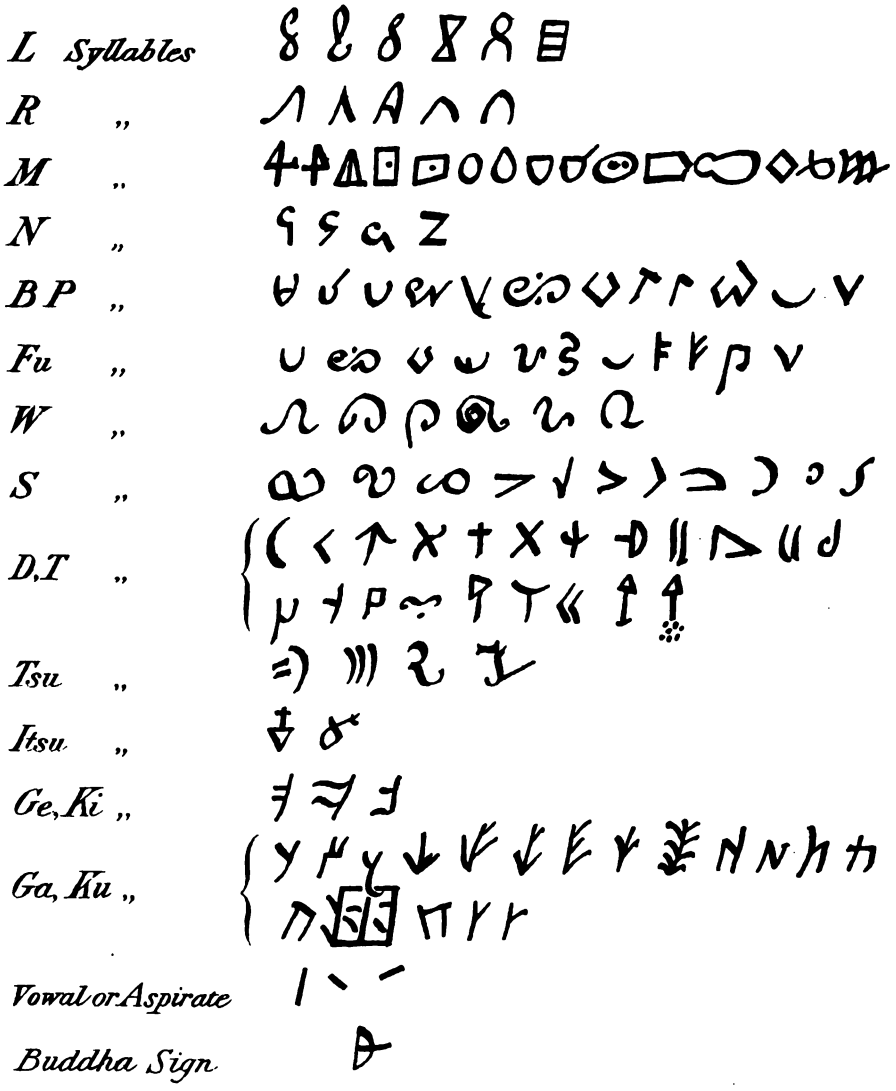


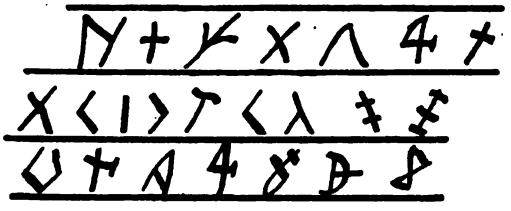
PLATE II.—

No. 1.

YARMOUTH STONE, NOVA SCOTIA.

No. 2.

No. 3.



No. 4

No. 5.

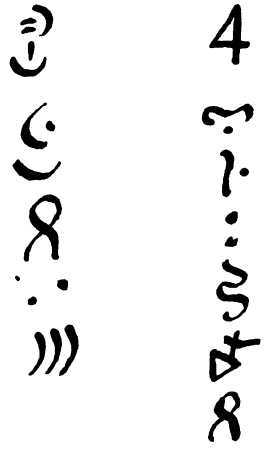
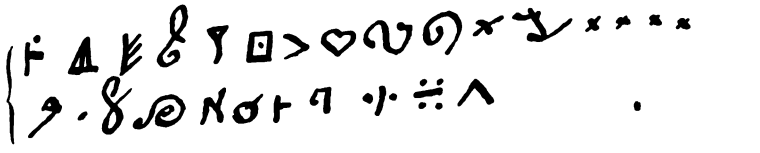


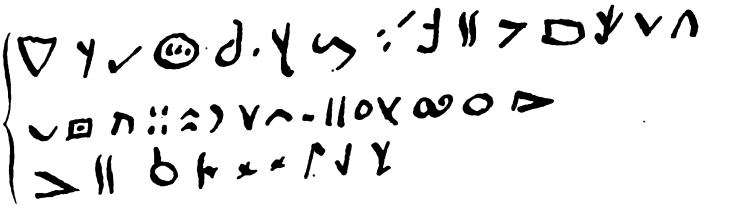
PLATE III.

No 6

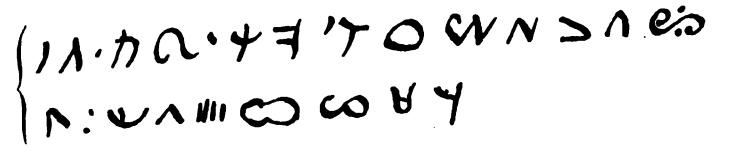
Line 1



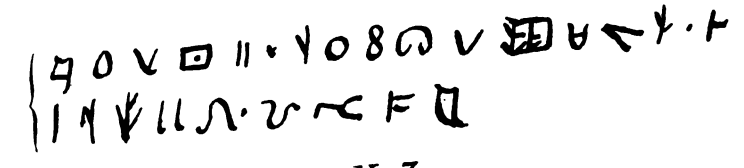
Line 2



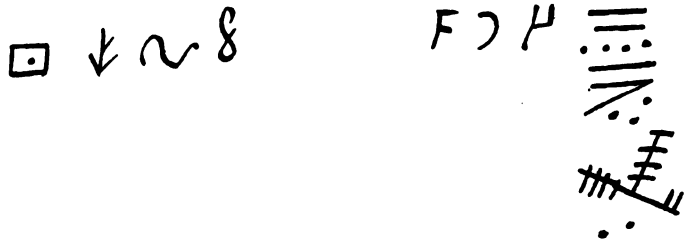
Line 3



Line 4



No. 7.



The D with a stroke through it I have shewn, in the discussion of the Siberian inscriptions, to be an ideograph for Buddha; and the final character is a power of *l*.

Thus the whole may be read as follows:

No. III.

Ka to go to ra mi to
do te u chi ba te ri 2 3
fu ta ye ri mi itsu Buda li.

Put into shape, it is:

"Katogo Tora mito
Dote uchi bateri 2, 3
Fu taye ri miitsu Buda ri."

In English, literally:

"Katogo, Tora king
Mound house finished 2, 3.

Twenty to end the *ri* six Buddha period." And in English idiom: "Katogo, king of Tora, finishes the house of the mound, b 2 to end the sixth *ri* of the period of Buddha."

Here we have that priceless boon, a dated tablet. The Siberian inscriptions shew the *ri* to have been a period of 300 years. The mound being finished within 62 years of the sixth *ri*, it was 1738 years after Buddha's death, that is, in 1261, A.D., at the time when Kublai Khan and his Mongols were reducing Northern Asia. There is a great deal of aboriginal history contained in this brief inscription from a great mound, and, in my Hittite Track in the East, I have endeavoured to set it forth as embodied in Mexican story, for the Tora of the tablet is doubtless one of the Mexican Tulas.

There are two Ohio inscriptions. The smaller, furnished by Colonel Whittlesey, of Cleveland, is on a nodule of kidney iron ore, surmounting a human effigy. It was found in the bush in Plain Township, Stark County, between eighty and a hundred years ago, and, when last heard of, was in possession of Dr. Pease, of Manitou. The text is exceedingly brief, consisting of six characters, very runic in appearance. With the knowledge obtained from the texts already deciphered, it is easy to see in the third and fourth characters a *to* and a *ku*. The first and fifth, however, are new, and the Siberian documents must instruct us that these F like symbols are variants of *fu*: were their lateral strokes on the

left they would be *ke, ki* forms. The second and the last character are conventional forms of the tree, *ku* or *go*. Thus the reading of the six symbols is:

No. IV.

fu ku to ku fu ko.

In better order: *Fuku Tokufu ko.*

"Fuku, the child (son) of Tokufu."

The names are significant in Japanese, Fuku meaning "the fortunate one," and Tokufu "the place or law of virtue, power, or profit." The latter name seems to connect the chiefs with the Attakapas, who, at a later period, occupied parts of Louisiana and Texas.

The other Ohio inscription I received a photograph of from Professor Hilder, of St. Louis, in 1882. The stone on which it is was found in Brush Creek Mound, in Muskingum County. It is unique as an American record, both as regards the form of its characters and the direction of its writing, but has its analogues in Siberia. The document begins at the top of the left hand column. There the first group contains the parallels *te, de* combined with the *shi* symbol, and these together constitute the compound *dzu, tsu*. Below them is the short line, denoting a vowel or aspirate; and below that again comes a rounded *v* symbol, *fu* or *bu*. The next group contains an evident *te, de* in the convex curve, and the enclosed dot may stand for *hi* in *hitotsu*, one, while the lower curve is another *fu*. According to Cypriote and other analogies, the succeeding figure is a power of *l;* and the two dots below are to be read not as numerals, but in rebus style, as *fu* in *futatsu*, two. The three curves beneath must be separated into a *shi* form and the two parallels *te*, together furnishing the compound *tsu*.

The first character on the right is the *mi* of the Grave Creek Stone. Under it is the *ta, to* of the Yarmouth Rock, a dot taking the place of a straight line. It is possible that the dot may be the numeral one. The succeeding line with another dot gives one ten, followed by two dots and a *fu* character on its side, furnishing two twenties. After these comes the *itsu* of the Grave Creek Tablet; and the *li* or *ri* of the left hand column is repeated. We are now in a position to read the whole inscription, which runs as follows:

No. V.

tsu i fu te hi fu li fu tsu
mi to (1), 1-10 2-20 itsu li.

In connected order:

Tsuifu-Tehifu Lifutsu
Mito, (1), 1-10, 2-20 itsu ri.

In English:

"Tsuifu-Tehifu Lifutsu
King (1), 1-10, 2-20, 5-300.

Freely: "Tsuifu-Tehifu, King of Lifutsu,
fifteen hundred and fifty-one."

The only Khitan era is that of the death of Buddha; hence 1551 after Buddha places the inscription in 1074 A.D. The Lifutsu were the later Tallapoosas of Alabama and Georgia; and Tsuifu-Tehifu might be read Tsuifu-Tabi, when its meaning would be "the banished wanderer." Certainly, the first part of the king's name denotes his banishment, but from whence is a mystery. His time was that of the great upheaval which removed the Toltec dynasty from Mexico to Peru. In 1062, just twelve years before Tsuifu's burial in the Brush Creek Mound, this event took place, so that it is within the bounds of possibility that Mexico was the civilized home from which he was banished.

Most unworthy charges of fraud have been laid at the door of the Davenport Academy of Science in connection with the finding of two phonetically inscribed tablets in mounds near that city in Iowa. These tablets are of precisely the same character as those already deciphered, and as forgeries at the time are a simple impossibility. But ignorance and presumption have no limits. The tablet representing a cremation scene contains somewhat irregular groups of characters, which for convenience I arrange in four lines. It inverts the usual order, beginning at the right hand upper corner, and returning boustrophedon. But the third line begins at the left, and the fourth at the right. Its characters are roughly executed, partaking to a certain extent of the hieroglyphic form. An *s* syllable in particular, representing the pointing of the hand to the face, is there, although rare in Siberia and in India. It is common, however, in Syrian Hittite and in Mexican hieroglyphic.

The lines read as follows:

NO. VI.

No. 1.—*ri 4 3 fu to ma ka wa la ka . . . tsu ta wa shi ma shi ma to la ku mi to.*

No. 2.—*me ku shi mi to gu ne shi 2 hi ki te shi me ko fu ri fu mu ka 4 to shi fu ri a te ma pa se me da shi ta mi to . . . bu chi ko.*

No. 3.—*hi ro · ku wa · ta ki a te ma pa ka shi ra fu ri · fu ri ya me shi po ku.*

No. 4.—*ta ki sa i fu · wa ta gà ye hi to · ki shi po ku fu wa la ma ku a te ma pa mi to.*

In Japanese order, this is:

No. 1.—*Ri 4, 3 fu to, Maka-Wala ka . . . tsu tawashi Mashima Tolaku mito.*

No. 2.—*Mekushi mito gunshi 2 hikite shimeko Furi fumuka 4 toshi Furi Atempa semedashita mito . . . buchi ko.*

No. 3.—*Hiro · kuwa · taki Atempa kashira Furi · Furi yame Shipoku.*

No. 4.—*Taki saifu · watagaye hito · ki Shipoku fu Wala-Maka · Atempa mito.*

The translation of this valuable document is: "Mashima, king of Tolaku, the general of the king of Mekushi, overthrew in battle Maka-Wala, twelve hundred, three score and ten. Furi having resisted four years two summons to withdraw, the king drove him by force out of Atempa and . . . put him to death.

"The great fire burns Furi, the captain of Atempa, and Shipoku, the wife of Furi. It also burns a man transgressing the peace. The father of Shipoku is Wala-Maka, the king of Atempa."

The other inscribed tablet from Iowa was found in 1878, in a mound not far from that which contained the cremation scene. Its inscription is very brief, consisting of four characters to the left of a rude effigy, and three, with signs of numeration, to the right. Between the two groups, and above the head of the figure, is the representation of a copper axe, and over the whole are carvings in imitation of two of the stone pipes, exhibiting animal figures, that were found in the mounds. The inscription, so far as the numerals go, must be read in the light of Mashima's record, for it presents in part a new system of notation.

No. VII.

Left side: *Maka Wala.*

Right side: *Buchiko* = 4 ⸢ 3, 1, 10, 2.

In English:

"Maka-Wala
Killed 1272."

Here the parallels must be symbols of the *ri toshi* or period of 300 years; the v i on its side must similarly represent the old word for

twenty years, *futachi*, now changed to *hatachi*, and the one, ten and two units explain themselves. Maka-Wala must thus have been put to death two years after the burning of his daughter Shipoku and his son-in-law Furi, unless the four years of Furi's refusal to surrender be taken into account. At any rate, the date of Maka-Wala's overthrow is 1272 after Buddha, or 793 A.D., and that of his death is 795 A.D. It may be that Furi and Shipoku were murdered and their bodies burned in 797. This for America is a great antiquity, and carries us back to the beginings of Mexican history. Maka-Wala was a contemporary of Charlemagne, and represents the earliest band of Mound Builders that, landing in Vancouver, found their eastern way through our North-west to Lake Superior, and thence, down the Mississippi, to Iowa.

I have no time here to comment on these seven inscriptions. A full commentary, connecting them with the Siberian series and with fragments of native tradition, will be found in my Hittite Track in the East, whenever that book may be published. Four dated tablets, extending from 793 to 1261 A.D. are more than the most sanguine explorer of American antiquities ever hoped for, yet they may be only the first fruits of an abundant historical harvest. At any rate, the publishing of the foregoing seven documents will enable students to intelligently read any similar relics that may come in their way, whether engraved on prepared stones or on rock faces. That many such will yet reward the labour of explorers I cannot doubt. Should what has been written encourage the disingenuous to forgery, the fraud will not long deceive, unless its perpetrator be a consummate master of archaic Japanese. But no such scholar would stoop to the meanness of archæological deception.

NOTES.

Analysis of the Inscriptions.

No. I. (Yarmouth.)

wabi, peacefully in Sib. and Ind. inscript., now ***wa*** is peace.
deka, past of de-ru-ta, to go out.
Kutarade, proper name, (?) Iroquois Katorats, "The Hunter."
bushi, a soldier.
goki, brave, but Sib. and Ind. have ***goka*** for ***goku***, eminent.

No. II. (West Newbury.)

Dehana, proper name probably of Tionon Hurons.
no, genitive particle.
Mekashi, proper name, in Japanese "The Quick."
bushi, as in No. I.
setsu, season, period, time.
no, as above.
fuye, an old word meaning "the sum"; survives in ***fuye-ru***, to add, and ***haye-ru***, to pile.
fu, common Sib. and Ind. abbreviation for ***futa***, two, and ***futachi***, now ***hatachi***, twenty.
Torishime, proper name, in Japanese "to control, keep in order."
tama often stands in Sib. and Ind. for ***atome***, heir.

No. III. (Grave Creek.)

Katogo, proper name, perhaps Jap. *Kataku*, "The Firm."
mito, universal Hittite word for king, from *mi* honorable, and *to* door. Replaced by *mikado*, with same meaning.
dote, a mound.
uchi, a house.
bateri, now *hateru*, to finish. Many initial aspirates are changed labials in Japanese.
fu, for *futachi*, twenty, as above.
taye-ru, to come to an end.
ri now denotes a Japanese mile, but in Sib. and Ind. is a period of 300 years.
miitsu, old form of *mutsu*, six.
Buda, proper name, Buddha.
li or *ri* is law, rule, principle.

No. IV. (Stark County.)

ko is the only word requiring explanation; it denotes a child or the young of anything.

No. V. (Brush Creek.)

mito, king; see No. III.
itsu, five.
li or *ri*; see No. III.

No. VI. (Davenport Cremation).

line 1. *ri*, see above; also *fu* for *futachi*.
to, ten.
Maka-Wala, proper name, perhaps *Maki-wari*, the "Splitting Axe."

ka . . . tsu is doubtful, because the stone is broken, and the characters are peculiar ; *kutsu*, to conquer, overcome.
tawashi for *taoshi*, to cast down, overthrow.

line 2. *gunshi*, a military officer.
hikite for *hiki*, *hikita*, to retreat, retire.
shimeko, noun derived from *shimeshi*, to admonish, instruct.
fumuka, old form of *hamukai*, to oppose, resist.
toshi, year.
semedashita, past of *semedashi*, to afflict and expel, persecute and cause to leave.
buchiko, probably for *buchi-korosu*, to beat to death.

line 3. *hiro*, broad, spacious.
kuwa, now *kuwaji*, a fire, conflagration ; all compounds are made up of *kuwa*, alone.
taki, to burn.
kashira, a captain.
yame, for *yamome*, widow, as in Siberian.

line 4. *saifu*, for *saiyo*, also.
watagaye, from *wa*, peace, and *tagaye-ru*, to transgress, break, not conform to.
hito, a man, a Hittite.
ki, is, part of the verb *suru*, to be, to do.
fu, old word for father in composition, as in *fu-shi*, father and child, *fu-bo*, father and mother.

No. VII. (Davenport Effigy.)
buchiko ; see No. VI., line 2, at end.

WALES AND ITS LITERATURE.

BY NEIL MACNISH, B D., LL.D.

[*Read 1st February, 1896.*]

In his "Eastern Origin of the Celtic Nations," Pritchard thus writes: 'There are six dialects of the language termed Celtic which may be said to survive, as five of them are still spoken, and one of them, viz., the Cornish, is sufficiently preserved in books. These six dialects are the Welsh, the Cornish, the Armorican, the Irish or Erse, the Gaelic or Highland Scottish, and the Manks. The three former are the relics of the idiom of the ancient British; the three latter of that spoken by the inhabitants of Ireland." That division of the Celtic dialects is sufficiently lucid, and may be accepted, with the exception of the undue importance which is assigned to Irish, as if it were older than the Gaelic of Scotland. Thomas Stephens, the learned and ingenuous author of the *Literature of the Kymry*, remarks "that Welsh or Walsch is not a proper name, but a Teutonic term signifying *strangers*. The proper name of that people is Kymry. They are the last remnant of the Kimmerioi of Homer, and of the Kymry (Cimbri) of Germany. From the Cimbric Chersonesus (Jutland) a portion of these landed on the shores of Northumberland, gave their name to the County of Cumberland, and in process of time followed the seaside to their present resting-place, where they still call themselves Kymry, and give their country a similar name, *Kymru*." It is difficult to ascertain what the political divisions of Great Britain were at any given time, in those unsettled ages which extend over the invasion of the Romans and of subsequent nations, until an approximation at least to the settled divisions of more modern days was reached. The position of the tribes or nations that were contending for the superiority in Britain was continually changing, according to the chances of war. The Celtic inhabitants fought bravely for their homes and firesides, and surrendered what they had every reason to regard as their own country only after a bold and fearless effort to retain possession of it, and to expel those who had no claim on it, save that which came from unprincipled adventure, and an irrepressible love of plunder. Skene, in his *Four Ancient Books of Wales*, thus writes: "We find the seaboard of Wales in the west in the occupation of the Gwyddyl or Gaels, and the Cymry confined to the eastern part of Wales only, and placed between them and the Saxons." Skene is of the opinion that "the Gaels who," according

to his own admission, "occupied the seaboard or western portion of Wales were not a portion of the original inhabitants of the country, but immigrants from Ireland who chanced to make their homes in that part of Wales." There is *prima facie* a stronger likelihood that the Gaels in question were the remains of a Celtic population, older in point of time and occupation, than that they came from Ireland and finally settled in Wales amid the fluctuations which then obtained among the nations that contended for supremacy in Britain.

Edward Lhuyd, the Father of Celtic Philology, has this opinion to advance: "There are none of the Irish themselves that I know of, amongst all the writings they have published about the origin and history of their nation, that maintained they were possessed of England and Wales; and yet whoever takes notice of a great many of the names of rivers and mountains throughout the kingdom will find no reason to doubt but that the Irish must have been the inhabitants when those names were imposed upon the rivers and mountains."

With reference to the Ogam inscriptions which are to be found in Wales, Professor Rhys asserts that "the Celts who spoke the language of the Celtic epitaphs were in part the ancestors of the Welsh and Cornish peoples. In other words, they were the Goidels belonging to the first Celtic invasion of Britain, and of whom some passed over into Ireland and made the island also Celtic. Some time later there arrived another Celtic people with another Celtic language. These later invaders called themselves Brittones, and seized on the best portions of Britain, driving the Goidelic Celts before them to the west and north of the island, and it is the language of these retreating Goidels of Britain that we have in the old inscriptions, and not of Goidelic invaders from Ireland. Their Goidelic speech which was driven out by the ever-increasing dialects of the Brythones was practically the same language as that of the Celts of Ireland, of Man, and of Scotland."

"It has been ingeniously contended that the root in *Britanni* and *Brittones* is identical with the Welsh *brith*, spotted, fem. *braith*. It would appear, therefore, that the word *Brython* and its congeners meant a clothed or cloth-clad people. The name may be regarded as meant to distinguish the Brittones from the natives whom they found in possession, and whose clothing may have consisted of the skins of the animals that they killed. . . . It is safe to limit the name to the non-Goidelic branch of the Celts of the second invasion."

The Welsh have a copious literature. As well in prose as in verse, they have many works of venerable antiquity and, therefore,

of very great value and interest. For faithfulness to their language and traditions; for a resolute determination to uphold their language and to cultivate it assiduously in these modern days; for a liberal, national recognition of excellence in writing their language either in prose or verse; for a refreshing absence of everything that betokens a desire to ignore or forget their language; for a well-arranged system to make every Welshman proud of his language and of his people and country, the palm has to be awarded to the Welsh among the Celts of Great Britain and Ireland. A Welsh clergyman, the Rev. Griffith Jones, of Llandower, was instrumental in exciting among his fellow-countrymen a love of their native language and a desire to be able to read it and to study its literature for themselves. He was the first who made an attempt of any importance to erect schools for the instruction of the people in their own language. It was in 1730, that he began his patriotic labours which have proved of incalculable service to Wales. Mr. Jones devoted thirty years of his life to his patriotic work, and had the satisfaction of gaining many co-adjutors in his laudable efforts to educate his countrymen in their own language. He was successful in establishing two hundred and twenty schools during his life-time. It redounds to the credit of the Britons that they were able, in the face of the legions of Rome, to preserve their distinctive existence to a very large extent. The Welsh exhibited all the characteristics of the genuine Celts in their long, determined and gallant resistance to the attempts which English monarchs made to deprive them of their liberty and to annex Wales to the kingdom of England. It may be conceded that from the departure of the Romans in 446 A.D., until Llywellyn ap Gruffydd, was killed in 1282, and with him the liberty and independence of Wales were lost, the Welsh had to fight for their homes and firesides.

The Eisteddfoddau—those sittings or sessions or congresses of bards or literati, which are now held every year—have always possessed an immense power, so far as inducing the Welsh people to love their language, their literature and the traditions of their country is concerned; so far as determining to be faithful to their nationality is concerned; so far as refusing to forget their language on grounds of strict utilitarianism, and to ignore or think lightly of their literature, is concerned. A very remote antiquity is assigned to the Eisteddfod. It is said that it originated in the time of Owain ap Maxen Wledig, who at the close of the fourth century was elected to the chief sovereignty of the Britons on the departure of the Romans. It is said that the Gorsedd or Assembly, from which the Eisteddfod has sprung, is as old as the time of Prydain, the son of Edd the Great, who lived many centuries before the Christian era. The Eisteddfoddau have a very strong hold on the

Welsh imagination, associated as they are with all that is dearest and most worthy of remembrance in the traditions of the past. In their devotion to their annual gatherings and contests, and in the natural pride which every Welshman has in those time-honoured assemblies, there is a force which is powerful enough to oppose the utilitarian spirit of our age, to stem the tide of hostility to the perpetuation of the Celtic languages, and to insure for Welsh a long life of healthfulness, vigour and independence. The biographer of the Rev. Thomas Price, whose bardic name was Carnhuanawc, and who was one of the best and most enthusiastic Welsh scholars of his day, has this felicitous definition of the Eisteddfoddau to give: "The word Eisteddfod signifies a public session of persons formally convoked at stated periods in one part or other of the Principality of Wales, for the enjoyment of intellectual intercourse, for the exercise of mutual emulation, and for the promotion of Cambrian literature, rhetoric, poetry, music and all ingenious and useful arts within each specified district, that district extending in the days of the native princes throughout the four provinces of Wales and the Marches. Such periodical meetings have their historic records from the sixth century of the Christian era, and appear to have been held among the Cymry from immemorial time, sometimes encouraged by the auspicious countenances and liberal rewards of sovereign princes and wealthy nobles, and at others solely sustained among the commonalty by the irrepressible energy of native genius." In his introduction to his Lectures on the Study of Celtic Literature, Matthew Arnold thus writes to the Welsh: "When I see the enthusiasm these Eisteddfods can awaken in your whole people, and then think of the tastes, the literature, the amusements of our own lower and middle class, I am filled with admiration for you. It is a consoling thought, and one which history allows us to entertain, that nations disinherited of political success may yet leave their mark in the world's progress, and contribute powerfully to the civilization of mankind."

The Principality of Wales embraces twelve counties, of which Anglesey, Carnarvon, Flint, Denbigh, Merioneth, Montgomery go to form North Wales; and Brecknock, Cardigan, Carmarthen, Radnor, Glamorgan, Pembroke constitute South Wales. The population of Wales was 1,111,780 in 1861, and 1,217,135 in 1871. Those figures, so far as they go, prove that the tide of emigration from Wales is by no means so strong as it is from Ireland and the Highlands of Scotland. There appears to be greater stability among the Celts of Wales; and hence arises a remarkable facility for perpetuating their language and their traditions, in spite of their nearness to the English-speaking inhabitants of the counties that lie to the east and south of them. The Celts whom

the Romans found in Britain were able to hold their ground very tenaciously, and were not compelled to submit to absorption or to menial servitude, or to retire before their conquerors to the remotest portions of the country. The words of a certain writer regarding the people of Britain after the Romans had finally withdrawn from it are to this effect :— "They were Britons, modified no doubt in every respect by their long subjection to Rome, but still essentially a British, *i.e.*, a Celtic people, and it is further clear that they were a people who had been less modified by Roman influences than the inhabitants of the other provinces of the empire." Carnhuanawc, though a Welshman of extensive scholarship and excellent character, is perhaps employing extreme language when he affirms that "the Welsh poems bear evidence of the existence of a spirit of patriotism in a far greater degree than those of the Irish or the Gaelic." As regards the quantity of matter before the public, both in verse and prose, as well as the number of authors whose works are extant, the Welsh language has vastly the advantage over the Irish and Gaelic. In priority of date the advantage is also on the side of the Welsh. In historical realm, the Welsh poetry greatly excels that of the other two languages, inasmuch as it treats of actual occurrences, whereas the other two deal more with fiction." It is to be feared that those strong asseverations, coming though they do from so excellent an authority as Carnhuanawc, are to be accepted with some degree of reservation ; for they certainly exhibit the extraordinary patriotism which he cultivated assiduously in his own case, and which he sought to impress very strongly on all the natives of the Principality.

The literature of Wales is, however, very extensive. There is extant a large number of Welsh MSS. With the exception of MSS. that are in the British Museum and in the libraries of Oxford and Cambridge, the Welsh MSS. that are extant are in private collections. To a very important collection, the name Hengwrt collection has been given, containing as it does MSS. which were collected by Jones of Gelly Lyndy between 1590 and 1630, and by Robert Vaughan, of Hengwrt, who died in 1666. There was an agreement between the two friends that on the death of one of them, the survivor should become possessor of the whole collection of MSS. As Mr. Vaughan survived his friend Jones, the MSS. became his property, and thus obtained the name of the Hengwrt collection. The collection, amounting to about four hundred volumes, was subsequently given or bequeathed to Wynne of Penraith.

The *Myvyrian Archæology* of Wales : such is the name of a collection extending over three volumes, which contain the text of a large number of the poems and other compositions that are to be found in Welsh

MSS. To the patriotism and indefatigable energy of Owen Jones, the honour belongs of preparing and publishing the work in question. Jones was born before the middle of the last century in the vale of Myvyr which has given its name to his Archæology. He pursued the trade of furrier in London, and was successful in amassing a fortune that he generously expended in the transcription of MSS. which he eventually published with the designation that has been mentioned. His Archæology is regarded as the great repertory of the literature of his nation. The Myvyrian MSS., which are now in the British Museum amount to forty-seven volumes of poetry, two thousand Englynion, and fifty-three volumes of prose. Skene published the Four Ancient Books of Wales with an English translation. They are:

(*a*) The Black Book of Caermarthen.
(*b*) The Book of Aneurin.
(*c*) The Book of Taliessin.
(*d*) The Book of Hergest.

A particular importance attaches to the Archæologia Britannica which was prepared by the famous Edward Lhuyd. The first place has by common consent been assigned to him among Welsh philologists. He broke, as it were, fallow-ground in the Celtic portions of Great Britain and Ireland. He thought so little of danger and fatigue, in those early days of dangerous navigation, as to expend five years in the countries and among the islands where members of the Celtic family were to be found, that he might learn their language and become familiar with their literature. His Archæologia Britannica was published in 1707. The collection which he made of Celtic material must have been both extensive and valuable. Owing to his premature death, the second book which he had in contemplation was never published. Through various causes, his literary treasures were subsequently lost, and thereby Celtic learning was deprived of much useful and rare material. It is clear from the tuneful commendations in Latin and Gaelic verse which are prefixed to his Archæologia that Lhuyd made a favourable impression on the clergymen with whom he came in contact. Many of them were such elegant scholars as to commit to faultless verses their high appreciation of Lhuyd and his arduous services in behalf of Celtic literature.

The popularity which MacPherson's translation of the poems of Ossian obtained when it was published after the middle of the last century, must have exerted considerable influence on Welsh scholars, insomuch that they turned their attention to the oldest portions of the literature of the Principality. Evan Evans, Edward Jones, Edward Williams, Owen Pughe, Sharon Turner, Edward Davies and others made important con-

tributions of larger or smaller magnitude to the literature of Wales, to bringing to light its hidden treasures, to deciphering and explaining the more ancient and unintelligible Welsh MSS., and to exciting among English readers a desire to gather some acquaintance at least with the literature of the Britons. Neither in Irish nor in Welsh literature is there any ancient poetry that can be placed on a footing of equality with the poetry of the Ossianic age—with the poems of Ossian, Ullin and Oran. There are no poems in Welsh literature to be compared, in point of grandeur of conception and of continuous narrative and powerful sentiment, with the poems of the Bard of Selma. The enthusiastic admirers of Ossian claim for him a much earlier date than that which is assigned to Taliessin. It is generally conceded that the most important books or treatises that have been written in more recent years had as their authors Carnhuanawc, the talented and patriotic clergyman Thomas Price; Thomas Stephens, the author of the Literature of the Kymry and several other works; and Skene, the learned editor of the Four Ancient Books of Wales, containing the Cymric poems attributed to the bards of the sixth century. Justice is merely done to Mr. Skene when it is said that he has rendered immense service to the Celtic literature of Scotland, his native country, and that he had no superior in judgment and in learning in the very abstruse sphere which he selected for his peculiar labours. His Four Ancient Books of Wales embrace the *Black Book of Caermarthen*, the *Book of Aneurin*, the *Book of Taliessin*, and the *Red Book of Hergest*. "It is in those four MSS.," Skene writes, "that the oldest known texts are to be found, and in order to avoid any risk of its being coloured by my own views, I refrained from attempting the translation myself, and to obtain it, if possible, from the most eminent living Welsh scholars." Mr. Skene bestows this commendation on Mr. Stephens: "His work is written with much ability and is in fact the first real attempt to subject these poems to anything like a critical analysis." Thomas Stephens, and the modest, learned and indefatigable Irish scholar Eugene O'Curry, are entitled to a similar meed of praise. Their painstaking labours in the interest of their respective countries have surely earned for them an honourable and a permanent place in the affections of the Welsh and Irish.

Thomas Stephens was essentially a self-made, and to a large extent a self-taught man. He was stimulated by the Eisteddfoddau to prosecute his researches into the less-known channels of Welsh literature. He was distinguished for the breadth and accuracy of his views, for his unflinching love of truth, and for his active sympathy with every movement that tended to improve the position of his fellow-countrymen. He preferred truth to patriotic pride, and incurred disfavour because he

refused to accept legendary accounts of Welsh greatness which could not bear the strong and searching light of honest and impartial investigation.

Arthur and the Knights of the Round Table have obtained particular celebrity in Welsh literature. Lord Tennyson has, in his Idylls of the King, woven into chaste and musical verse the tales of Arthur and his Knights. The common tradition is that Arthur was the son of Meirig ab Tewdrig, or of Uthyr-Wonderful—a prince of the Silurian Britons; that about the year 517 A.D. he was summoned to assume the leadership of his people against the foes of his country; that he was successful in many battles; that his career as a warrior came to a close in the battle of Camlan in 542; and that his remains were interred at Glastonbury. Legendary exaggerations have gathered round Arthur to an almost incredible extent. Skene, who has thoroughly examined the four oldest Welsh MSS. that are extant, has this statement to make regarding Arthur: "It is very remarkable how few of these poems contain any notice of Arthur. If they occupied a place, as is supposed, in Welsh literature subsequent to the introduction of the Arthurian Romance, we should expect these poems to be saturated with him and his knights, and his adventures; but it is not so. Out of so large a body of poems there are only five which mention him at all, and then it is the historical Arthur, the Guledig to whom the defence of the wall was entrusted, and who fights the twelve battles in the north and finally perishes at Camlan." Stephens has no confidence in the truthfulness of the eulogies that have been bestowed on Arthur. His distinct language is, "Arthur, an insignificant chieftain in the sixth century, grew into a valorous warrior in the eighth, and by the twelfth had become warrior of the whole civilized world." Arthur is confessedly a Kymric hero. Nothing can be more apparent to the student of Cambrian literature than that the bards were among the last persons in Europe to admit the credibility of the Arthurian tales. We must, therefore, seek the first traces of the Arthur of Romance among the Kymry of Armorica. The people of Armorica, and of ancient Gaul generally, are supposed to have been the same people as the Colonists of Britain; and this would seem to be the reason why, during times of distress, the Britons fled there for refuge. The Kymry, who left their native land on these occasions, carried with them the histories of their ancestors. Many of these were the Kymry of Cornwall, which, next to Wales, formed their last resting point; and these would very naturally exalt the actions of their countryman Arthur. The dialect of the Britons bears a closer resemblance to that of Cornwall than to the language of the Principality. Rhys of Tewdwr (1077, A.D.), is reported to have brought from Brittany the bardic system of the Round Table to Wales. The conclusion is,

therefore, both legitimate and irresistible, that the Romantic Arthur is a creation of the Armorican Kymry."

It is beside my purpose to enter into an examination of grammatical peculiarities of the Welsh language. Suffice it to remark that when a comparison is made between the grammatical structure of Welsh and of Irish and Scottish Gaelic, evidence sufficiently lucid and abundant is available to show that Irish and Scottish Gaelic is much older than Welsh, and that its grammatical forms lend strength to other reasons that indicate that Welsh is a later language than either Irish or Scottish Gaelic, and, therefore, that those who speak and spoke Welsh—*the Brittones*—followed at a long interval the Irish and Scottish Gaels in their immigration from the continent of Europe into Great Britain and Ireland.

As to the zeal with which Welsh scholars have always determined to develop the intrinsic strength of their own language, we have this explicit commendation from Thomas Stephens: "The language of the Kymry is rich in native roots, and several of the bards who lived during the twelfth and succeeding centuries have done much to develop its capabilities. They wisely determined to cultivate their own tongue rather than borrow words from others, and as they had clear perceptions of the philosophy of language, the services rendered to their parent speech by the writers of these centuries will ever give them a strong claim upon the respect and admiration of their countrymen. They formed their compound words upon principles really philosophical, and when the number of Kymric words was so great, it will scarcely create surprise that men proud of their language and with intelligence enough to develop its capacities should have produced lasting monuments of their own skill and of the inherent wealth of the Cambrian language."

As is the case with English, and German, and Gaelic, and Irish, the translation of the Holy Scriptures has exerted a most beneficial effect on the prose literature of Wales. Doubtless there is to be found in that translation, the purest and best Welsh that was obtainable or available when it was made. To Bishop Morgan the honour belongs of completing and publishing a translation into Welsh of the Scriptures of the Old and of the New Testament. William Morgan was a native of the County of Carnarvon. He was educated at St. John's College, Cambridge. He obtained a vicarage in Montgomeryshire in 1575. In 1578 he removed to a living in Denbighshire, where he completed his translation of the Bible into Welsh. His intention at first was to translate the books of the Pentateuch merely. He was induced by Whitgift, the Archbishop of Canterbury, to undertake the translation of the whole Bible. In 1588 the Welsh Bible was published, with a dedication to Queen Elizabeth.

Success attended Morgan, for in 1594 he was elected Bishop of Llandaff, and in 1601 he was translated to the Bishopric of St. Asaph. He died in 1604. It appears that few efforts were made before the time of Morgan to translate any portion of the Bible for the benefit of the Welsh people. There was published in 1551 by William Salisbury, a lawyer, a translation of the portions of Scripture that were appropriate to the communion service. In 1567 he published an entire version of the New Testament into Welsh, in the preparation of which he was aided by the Bishop of St. David's, Dr. Richard Davies, and by the Rev. Thomas Huet, a precentor of St. David's. There is reason for believing that before this time a translation was made of the Pentateuch into Welsh which was never published.

Singular to relate, an Act of Parliament was passed in 1563, in the fifth year of the reign of Queen Elizabeth, directing that a Welsh version of the Old and New Testament should, under the superintendence of the four Welsh bishops and of the Bishop of Hereford, be prepared for general use in the Welsh churches on the first of March, 1566, and in the event of a non-compliance with that enactment a penalty of forty pounds was to be inflicted on each prelate. Assistance was given to Morgan in the preparation of his translation of the Holy Scriptures by a number of eminent Welsh scholars. The version of the New Testament which was prepared and published by William Salisbury, was adopted by Morgan with some alterations. The Welsh Bible has always been regarded, even from a literary point of view, as the most valuable work in the language. It has been said of it that, after full admission has been made of all its imperfections, it must be regarded as among the noblest attempts to familiarize modern nations with the truths of revelation, and as an imperishable monument of the zeal, learning and industry of its author.

THE FUR TRADE, 1783-7.

BY CAPT. E. CRUIKSHANK.

[*Read 23rd February, 1895.*]

Towards the end of the revolutionary contest, the fur trade had distinctly declined in importance, partly from the disturbed state of the country, but partly also in consequence of the very serious ravages of hunger and disease among the Indians.

In March, 1783, Langlade reported that "there were forty Saulteaux, men, women and children who were eating each other because of the famine in La Baye des Noques," and soon afterwards Cadotte wrote from Sault Ste. Marie to say that "all the Indians of Fond du Lac, Rainy Lake, Lac des Sables, and other surroundings, had died of smallpox." At the same time Captain Robertson, the commandant at Mackinac, complained that a certain Mons. Bouché, a Canadian having a Spanish commission, was levying blackmail from the traders on the Mississippi at the head of "a gang of moroders."

One of the first acts of Sir John Johnson after being appointed Superintendent of the Indian Department, was to make a vigorous effort to assert his authority over the traders scattered throughout the vast region to the westward of Detroit, with the object of securing fair dealing with the natives as far as practicable.

"You are in all matters of trade where the Indians are concerned, to see that the utmost justice be done them," he wrote to Alexander McKee, "for which purpose if the interference of the commanding officer should be necessary, you are to make application, as you are to do in all matters where the king's service is concerned, unconnected with the interior economy of the Indian Department."

It was naturally anticipated that the Americans would "employ every effort to extend as far as possible their frontiers in the upper country, to secure in case of a peace some valuable settlements, and to get the fur trade into their hands."

The efforts of the British officers at Detroit were accordingly directed to the restraint of the Indians from further hostilities, and with this object Major De Peyster stated that he had "indulged" the Wabash Indians "with a trader in order to induce them to stay at home and follow their hunting."

But it could not be foreseen that the astute Franklin would obtain almost without asking, from the easy-going British plenipotentiary, the whole of that vast and valuable territory lying between the Ohio, the Mississippi, and the great lakes. It only remained for them to enter into possession. This, however, was no easy task, for the Indians were intensely hostile, and the new republic was weak in administrative ability.

The original North-west Fur Company, called at the time the "sixteen share concern," had dissolved at the end of a single year. In 1781, a new company, known as the "three share concern," was formed for one year, which did not, however, embrace the English River nor Mississippi within the scope of its operations. The success of this enterprise was sufficient to convince the merchants generally of the benefits of combination, and the number of "adventurers" trading in the North-west had in the meantime been reduced to twelve. Consequently, in October, 1783, a general partnership was agreed upon for five years, in which each stockholder was assigned an interest in proportion to his previous trade. The stock was divided into fifteen shares, of which 9¾ were allotted to non-residents. The expectations of profit were then so limited that one of the old traders readily accepted an offer of an annuity of 4,000 livres (£166, 13s., 4d. currency) in lieu of dividends. He lived to see a clear profit of £2,000 sterling derived from a single share.

The announcement of the terms upon which peace had been concluded overwhelmed the merchants of Montreal with amazement and dismay, for they not unnaturally feared that the fur trade within the frontier of the United States would at once and forever be lost to them.

These apprehensions, however, soon stimulated them to make increased exertions to extend their trade in the Canadian North-west.

In April, 1784, Benjamin Frobisher, one of the most active partners in the new North-west Fur Company, wrote to the Hon. Adam Mabane, a member of the Executive Council, asking definite information respecting the international boundary westward from Lake Superior, as he suspected that the Grand Portage was included by the treaty within the United States, as actually proved to be the case. At the same time he requested a passport for twenty-eight long canoes, valued with their cargoes at £20,000, which the Company intended to despatch to the North-west in May.

"This large supply," he said, "added to the property the Company have already in that country, demands their utmost attention. They do not know how soon they may be deprived of the immediate, and at present the only, communication from Lake Superior, and on that

account they intend, at their own expense, unless Government prefer to undertake it, to discover, if possible, another passage that will in all events fall within the British line, of which they may avail themselves in case of need. Such an undertaking must prove an arduous one and be attended with great expense, while their success will remain very uncertain, on which account the company are induced to hope that if it is discovered it will be granted to them in full right for a certain term of years, not less than seven, as a reward for their public spirit and the advantages that will result to this province from its discovery."

He advised the establishment of a small military post to command the entrance into Lake Superior at Point Aux Pins, where Mr. Baxter had built a small vessel during his unsuccessful mining operations, and suggested that a settlement might easily be founded at that place.

These proposals were favorably received by the Governor, who immediately instructed Captain Robertson to examine the coast near Point Aux Pins and report without delay. Early in June Robertson made the necessary exploration and pronounced in favor of Tessalon, "a beautiful and capacious bay and one of the best harbors on Lake Huron," with good soil and "a very advantageous fall for mills on the River Tessalon, and a large pinery adjacent." He had even sent a party of men to clear the ground for a fort when orders were received to abandon the project, as there was reason to believe that the "posts in the upper country" would not be given up "until the Americans manifested a stronger inclination (than they have hitherto done) to fulfil on their part the articles of the definitive treaty."

Robertson also reported that he had obtained "some intelligence from white men and Indians of a very fertile and advantageous tract of land between Lakes Huron and Ontario, and by communication that way the trade with Canada must be carried on to put us on a footing with our neighbors from the colonies."

In July, Messrs. Benjamin Frobisher and Simon McTavish arrived at Mackinac to make arrangements to suit the new state of affairs, and Robertson wrote to the Governor: "With them I have had several conferences with regard to the future communication to this country so as to enable them or others to trade in those parts on a footing with the Americans, and after every inquiry, that between Lakes Ontario and Huron is the only one to be attempted, and that very practicable, by shortening the road greatly and avoiding the Niagara carrying place and any interference with our neighbors." He evidently referred to the route from Matchedash Bay to Toronto, which was little used and had

become almost forgotten until Robertson declared his intention of returning that way to Quebec when relieved from his command.

In August Mackinac was unexpectedly menaced by an attack from the Ottawas, and the commandant was obliged to summon the traders to his assistance. They naturally complied with alacrity, as there were 4,000 packs of furs in store, 800 of which belonged to the North-west Company.

About the same time the merchants at Detroit, having a large quantity of valuable peltry on hand, asked leave to forward it to Schlosser in three small private sailing vessels, then afloat upon Lake Erie, while the King's ships were otherwise employed, a request which was readily granted by Lieutenant-Governor Hay, immediately after his arrival there.

"The commerce of this place," Hay wrote to Mr. Nepean, "is becoming more and more considerable. The peltry sent from it this year will amount to £100,000 sterling, all of which is the produce of English manufacturers except a small portion of rum, and I think, if the post is not given up, it will increase, for the Spaniards cannot send coarse woolen manufactures up the Mississippi so cheaply as the English can by this communication, a part of which they have this year bartered for their commodities, and in short cannot carry on their trade without them while we keep possession of the lakes."

The North-west Company executed their project of exploration by sending a large canoe to examine the north shore of Lake Superior, "navigated by six Canadians under Mr. Edward Umfreville, who has been eleven years in the service of the Hudson's Bay Company, and Mr. Venance St. Germain, both of them men who speak the language of the natives, and who are in other respects very well qualified to execute the Company's intentions.

"Their instructions were to proceed to Lake Alempigon, and thence in a west direction by the best road for transportation of goods and canoes to the River Ouinipique (Winnipeg) at or as near as may be to the Portage de L'Isle, and by letters received from them at Lake Alempigon, 30th June, it appears that they had met with innumerable difficulties from the want of Indian guides, but they then had one who had undertaken to conduct them to Lake Eturgeon, and they expressed the most sanguine hopes of getting forward from thence to the River Ouinipique."

In anticipation of the discovery which this party was expected to make, the Company applied for the "exclusive right to the passage they

may discover from the north side of Lake Superior to the River Ouinipique, and also of the trade to the North-west either by that passage or by the present communication by the Grand Portage for ten years," urging in support of their petition that they were the only persons that had any "interest or connection in that country."

They took advantage of this opportunity to describe the extent of their trade and the manner in which it was conducted.

"The inland navigation by which the North-west business is carried on is perhaps the most extensive of any in the known world, but is only practicable for canoes on account of the great number of carrying places. To give your Excellency some idea of which, there are upwards of ninety from Montreal to Lake du Bois only, and many of them very long ones.

"Two sets of men are employed in this business, making upwards of 500, one half of which are occupied in the transport of goods from Montreal to the Grand Portage in canoes of about four tons burthen, navigated by eight to ten men, and the other half are employed to take such goods forward to every post in the interior country to the extent of 1,000 to 2,000 miles and upwards, from Lake Superior, in canoes of about one and a half tons burthen, made expressly for the inland service, and navigated by four or five men only, according to the places of their destination.

"The large canoes from Montreal always set off early in May, and as the provisions they take with them are consumed by the time they reach Michilimackinac, they are necessitated to call there merely to take in an additional supply, not only for themselves but also for the use of the canoes intended for the interior country and the consumption of their servants at the Grand Portage, but as these canoes are not capable of carrying the whole of such provisions it thence becomes necessary to have a vessel or boats upon Lake Superior for that transport only, and the utmost despatch is required that everything may be ready in point of time to send off their supplies for the interior country, for which purpose the goods, provisions, and everything else required for the outfits of this year must be at the Grand Portage early in July, for the carrying place being at least ten miles in length, fifteen days are commonly spent in this service, which is performed by the canoe-men, who usually leave the west end from the 15th July to the 1st August, according to the distance of the places they are intended for.

"Their general loading is two-thirds goods and one-third provisions, which not being sufficient for their subsistence until they reach winter

quarters they must, and always do, depend on the natives they occasionally meet on the road for an additional supply, and when this fails, which is sometimes the case, they are exposed to every misery that it is possible to survive, and equally so in returning from the interior country, as in the spring provisions are generally more scanty. In winter quarters, however, they are at ease and commonly in plenty, which can only reconcile them to that manner of life and make them forget their sufferings in their annual voyage to and from the Grand Portage.

"The property the Company have already in that country, exclusive of their houses and stores and the different posts, as appears by the settlement of their accounts this present year, amounts to the sum of £25,303, 3s., 6d. currency, and their outfits for next spring, which will be sent from Montreal as soon as the navigation opens, will not fall much short of that sum, so that the Company will have an interest in July next of about £50,000 original cost in furs, to be sent to Montreal by the return of their canoes, and in goods for the interior country, by which your Excellency may judge of what may be expected from that trade when in our power by an exclusive right for ten years to explore the country and extend it."

In a few months this was followed by a second memorial from Peter Pond, who described himself as a partner in the Company, and who had been actively engaged in the exploration of the North-west in pursuit of trade for ten years. Pond declared that he had obtained positive information from "natives who have lately been on the shores of North Pacific Ocean," that the Russians had lately established a trading-station there, and further that he was credibly informed that ships were being fitted out in the United States under "the command of experienced seamen (who accompanied Captain Cook in his last voyage) in order to establish a fur trade upon the north-west coast of America at or near Prince William's Sound." From the carefully drawn map which accompanied his memorial, it appears that Pond had visited Fort Dauphin in 1775, and in 1776 and 1777 reached the site of the most distant trading post established by the French upon the Upper Saskatchewan. From 1778 to 1784 he had wintered near the mouth of the Athabasca. Frobisher traded near the ruins of Fort de Trait in 1774 and wintered in 1777 on a peninsula at Clearwater Lake.

On the 1st of August, 1785, James McGill formally announced the discovery of the new route to the North-west, in a letter to Lieutenant-Governor Hamilton.

"A new road has been discovered from the Lake of ——— or Nipigan, which runs to the N. of Wood Lakes and falls to the discharge of that

may discover from the north side of Lal
Ouinipique, and also of the trade to the
passage or by the present communication by
years," urging in support of their petition
sons that had any "interest or connection in

They took advantage of this opportunit
their trade and the manner in which it was

"The inland navigation by which the N
on is perhaps the most extensive of any in
practicable for canoes on account of the gr
To give your Excellency some idea of
ninety from Montreal to Lake du Bois
long ones.

"Two sets of men are employed in th
500, one half of which are occupied in
Montreal to the Grand Portage in canoe
navigated by eight to ten men, and the
such goods forward to every post in the
1,000 to 2,000 miles and upwards, from
about one and a half tons burthen, made
and navigated by four or five men only,
destination.

"The large canoes from Montreal a
the provisions they take with them are
Michilimackinac, they are necessitated
additional supply, not only for thems
canoes intended for the interior cou
servants at the Grand Portage, but a
carrying the whole of such provisio
have a vessel or boats upon Lake Su
the utmost despatch is required tha
of time to send off their supplies for
pose the goods, provisions, and every
this year must be at the Grand P
place being at least ten miles in len
in this service, which is performed
the west end from the 15th July
distance of the places they are inte

"Their general loading is two-t
which not being sufficient for thei

River) at the
was gone over
from Grand

is now carried
the mouth of
m that side of
of ———
ssissippi ; and to
whole north side
ole I esteem at
I am not £20,000
is brought from
the late treaty of
own line."

permitted to build
es instead of being
sort their property.
n of having their
may be imported the
leakage, embezzle-
money, which, you
head."

from twenty-one
th-west Company
tending to take her
mpracticable, now
tion of Lakes Erie
ast year owing to
about one thousand
emitted to Detroit
es in time, been sent
ettyaugers which left
e Indian trade, were
eached the places of
attendance returned
branch in particular
ed."

ient of the Indian
e lawless and unprin-

lian trade," he said, "requires regulation.
g to the disbanded troops have settled
on purpose to avoid the restraints of the
exercise every species of cheating, etc.
d quarrels give the Indians the most unfav-
ormerly no person was permitted to trade
n from the Superintendent of Indian Affairs;
nences Indian trader."

econd association of Montreal merchants was
of competing with the North-west Company,
w months they consented to a union by which
were added to the original sixteen, and the term
to seven years.

mittee of twenty-eight of the principal merchants
in trading to Mackinac and its dependencies, applied
to act as mediator between the Indian tribes in that
years the Chippewas had been at war with their
nomonees and Winnebagoes, and the sphere of
dually become extended until the Ottawas, Sacs,
ere numbered among the belligerents, and the life of
et on every hand with fresh perils, while it offered
gain.

ts," they said, "have been made to reconcile the jarring
nes the traders, when on the spot, have so far succeeded
at peace for a season, the good effects whereof were not
y the Indians than beneficial to the traders, as by that
ans remained unmolested on their respective wintering
naturally produced a considerable degree of success and
the merchant; but lately the disputes of those nations
a height above the power of the traders, assisted by the
anding at Michilimackinac, to control or appease, in conse-
of the trade has suffered greatly, and unless some remedy
time there is reason to fear the loss of a considerable part
able branch of commerce, in particular the whole of that
pon the Mississippi from the Illinois to its source."

ted French traders, Cadotte, Reaume, Ainse, and Gautier,
d as suitable persons to deliver messages to the several tribes
e them to agree to the proposals of a general peace. The
warriors of the Chippewa nation was estimated at 800; the
ees had 150; the Winnebagoes or Puants, 600, and the Outa-
Foxes, 1,400, while the various clans of the Sioux were sup-

posed to contain not less than 3,000 fighting men. The Sacs, numbering 1,300 men, had recently abandoned their villages on the Wisconsin River, and removed to the west side of the Mississippi to avoid the attacks of the warlike Chippewas, and the Spaniards were now reported to be making vigorous efforts to "attach them to their interest."

In consequence of these representations, Captain Dease was instructed to proceed to Mackinac and make preparations for holding a general council at that place in June, 1787, at which the Superintendent intended to preside in person, and Mr. Joseph Ainse was sent among the Indians with appropriate messages, to advise them to desist from hostilities, and invite their principal chiefs to the conference.

Ainse went from Green Bay by the Fox and Wisconsin Rivers to Prairie du Chien distributing presents and holding "talks" with the Menomenees and Winnebagoes as he passed through their villages. He then visited the Foxes and succeeded in detaining a large war-party which was about to march against the Chippewas. Ascending the Mississippi to the mouth of the Minnesota River he found the Sioux preparing to attack the Chippewas, and not only persuaded them to desist, but to release some of their prisoners. Continuing his journey up the Minnesota through all the Sioux villages, he turned back another large war-party and presented them with a pipe of peace to smoke with their enemies. Marching overland for seventeen days he arrived at the Falls of St. Anthony, in the heart of the country of the Chippewas, and spent the rest of the winter going from village to village describing what he had done among the Sioux, and urging them to make peace. His efforts were attended with such success that on the 14th of March the Sioux, Chippewas, Menomenees and Foxes assembled near the mouth of the Minnesota and concluded a treaty of peace, and agreed to send a deputation of six chiefs from each village to Mackinac

In May, Ainse returned to Prairie du Chien, accompanied by 196 chiefs, having despatched an equal number by way of Lake Superior, and the entire delegation assembled at Mackinac about the first of July, 1787, when peace was solemnly ratified in the presence of Captain Dease, the officers of the garrison, and traders of the post. The representatives of the different "nations 'invoked' the Great Spirit, the woods, the lakes and rivers, and the very ground they stood upon" to bear witness to the sincerity of their professions of friendship. At their own request, written articles of peace were formulated by Dease and acknowledged to be binding "whilst sun and moon shall remain."

Ainse was then instructed to winter among the Sioux to see that the terms of the treaty were faithfully observed by that fierce and turbulent race.

A REVIEW OF CARVALYN GAILCKAGH OR MANX CAROLS.

By Neil MacNish, B.D., LL.D.

[*Read 7th April, 1894.*]

Carvalyn Gailckagh: such is the designation which Mr. A. W. Moore, M.A., has chosen to give to an interesting and altogether unique collection of Manx Carols that has been recently published by him Though he has had able co-adjutors in preparing the carols for publication, his own labours have been so important as to justify him in saying, were he so disposed: *quorum pars maxima fui.* In a paper which I had the pleasure of sending to the Canadian Institute some time ago, I made a somewhat extensive review of another work which Mr. Moore has written, and to which he has given the title of "Surnames and Placenames of the Isle of Man." By the preparation and publication of the Manx carols, Mr. Moore has made another important contribution to the literature of the Isle of Man, and has intensified the claims which he has on the grateful appreciation of Manksmen everywhere, as well as on all lovers of Gaelic poetry. Some twenty years ago the remark was made by an eminent Manx scholar that "Carvals, which may be termed a literature entirely peculiar to the Manx people, consisting chiefly of ballads on sacred subjects, are yet to be found in many an out-of-the-way mountain farm-house, preserved in smoke-dried volumes, redolent of peat. A collection of these would many years hence form quite a literary curiosity, many of them possessing considerable merit. They are yearly becoming more difficult to procure, either from being altogether lost, or the unwillingness of the peasantry to part with their treasured manuscripts. Most of these Carvals are from 50 to 150 years old." The writer whose words have just been cited, has given a lucid statement of the literary value of the Manx Carols. An indirect commendation is thus bestowed on Mr. Moore, who has been successful in collecting and in publishing those Carols. The term *Carvalyn* is not strictly Manx. It is merely an adaptation in Manx of the English word *carol.* It is not to be supposed, however, that the Manx Carols, belonging as they do to the soil of Man, and having no kinship with ballads, resemble the English Christmas Carols. It appears that in former generations, it was customary for young people who imagined that they had poetical gifts, to compose Carols when Christmas was approaching, and to recite them in the parish

Churches. The carols which were successful in meriting the approval of competent critics were subsequently sung or chanted throughout the island. Many of those Carols were doubtless committed to writing, and were preserved in the more remote portions of the island, until Mr. Moore, and other Manx scholars of literary tastes akin to his, determined to search for them, and to bring them out of obscurity to the daylight of the world's knowledge.

It does credit to Prince Lucien Bonaparte, that he was acute enough to perceive the value of the Manx Carols and the consequent necessity of recovering them from the oblivion which would otherwise inevitably overtake them. Prince Lucien Bonaparte has made many valuable contributions to Celtic learning, choosing as he did to exchange the military traditions of his family for the quieter pursuit of learning. To him very great praise is due for the monument which indicates the resting-place of Dolly Pentreath, who was the last person that spoke the Cornish language. Mr. Moore tells in the preface how Mr. Fargher, the proprietor of the Mona Herald, and himself, came to unite their energies for the purpose of collecting the Carols of their native island and of putting them in a permanent and intelligent form, for the benefit not of Manksmen merely, but of all who may take an interest in a species of literature so rare and so unique. The Carols are 86 in number. The Manx and English versions of each Carol are given in parallel columns, insomuch that the greatest facility is thereby afforded to every intelligent reader for understanding the matter and the texture of those peculiar poems. As they were, as a rule, incorrectly if not illegibly written, great pains were necessary to decipher them, and to present them in a modern dress. It is obvious that after an expenditure doubtless of great trouble and diligence, Mr. Moore and his skilful co-adjutors, whose important services are very fittingly acknowledged by him, have had remarkable success in their patriotic desire to present those Carols in attractive attire to students of Celtic literature. It is well known that Luther's translation of the Bible into German gave an immediate and a permanent impulse to the cultivation of German literature. Invaluable aid must have been imparted to Manx literature by the publication in 1772 of the translation into Manx of the Holy Scriptures. It is contended that several of the Carols were composed and written before that date, and that as there was no accurate guide or criterion for writing and spelling Manx, there could be neither distinctness nor uniformity in the manner of committing those sacred songs to writing. John Phillips, who was consecrated Bishop of Man in 1635, was, it is said, so much a master of the Gaelic language as to translate into Manx the Common Prayer Book, and, according to a certain authority, the Bible also. There is, however, no valid ground for

believing that any translation of the Scriptures into Manx was made until long after the time of Bishop Phillips. Bishop Wilson was appointed Bishop of Sodor and Man in 1697. "The Principles and Duties of Christians"—the first book that was ever printed in the Manx language, was published by Bishop Wilson in 1699. He was actively engaged along with the Rev. Philip Moore in the translation of the Bible into Manx when he died in 1755. Dr. Mark Hildesley, his successor in the Bishopric of Man, undertook with laudable earnestness the completion of the translation of the Scriptures into Manx. He was frequently heard to say that he wished merely to see the completion of his translations.

On the 28th November, 1772, he received the last part of the translation of the Bible, and on the 5th December of the same year his earthly career terminated. It is manifest that the translators of the Holy Scriptures into Manx went on the principle of spelling the words phonetically, and with as near an approximation as was possible to the manner in which they were wont to be spoken. The expense of printing the Manx translation of the Bible was generously borne by the Society for Promoting Christian Knowledge. In the report of that Society for 1764, statements are made from which the inference is deducible that it was the intention to extend the distribution of the Manx Bible "so far as that no one person of the 20000 natives of the Isle of Man may be destitute of a Bible and a Common Prayer Book in his native tongue, in which they never appeared before." By the publication of the Holy Scriptures in their own language, Manksmen had henceforth a literary guide and standard of which they naturally were glad to avail themselves. The surmise has much to support it, that the authors of the Carols were generally indebted to the Bible for their thoughts as well as for the diction by means of which their thoughts found expression. Mr. Moore correctly states that "by far the greater number of the Carols are devotional rhapsodies which exhort the sinner to repent, by picturing with terrible realism the agonies of hell. . . . Old Testament history also received much attention, the fall of Adam, and the lives of Joseph, Jacob, Jonah and David being favourite subjects." As those Carols were held in high esteem, and were wont to be sung by the peasantry of Man, the moral character of the people must have thus been beneficially affected.

I shall make a few quotations from the English version of the Carols—a version which as a rule does no feeble justice to the original.

In Carval Yn Ullick, or Christmas Carol, these words occur:

"This is the day that Christ was born,
Why don't I praise his name?
Why don't I glory give to God?
For evermore the same.

The hosts seraphic sang on high
In strains of song refined :
And we will show God's peace, good will
And love to all mankind."

In Roish my row flaunys er ny chroo, or Before the Heavens were created, these verses occur :

"Before the light of moon or sun,
Or star or bright revolving ray,
Or yet the heavenly powers begun
To mete exact 'twixt night and day ;
What was there then ? What was there then
Before horizon was or time ?"

The first two stanzas in Carval Yonah or Jonah's Carvel, are these :

"The Lord's word came to Jonah :
To Nineveh go thou down,
And cry against the wickedness
That is wrought in that great town.
And straight rose Jonah early,
To Joppa's city he came,
And thereon found a good ship faring
To Tarshish of world-wide fame."

As Manksmen have an honourable place in the general renaissance of Celtic learning, the publication of the Manx Carols must tend materially to increase the affection of every patriotic Manksman for his native language and for the traditions of his native island. Though some of the Carols were evidently composed by men who had little or no knowledge whatever of letters ; and, though the sentiments that pervade the Carols are often simple enough, it must be remembered that the carols represent the best and purest language that was spoken at the time of their composition ; insomuch that the Manx scholar of to-day turns naturally enough to those Carols for the best specimens of his native language as it was spoken some two hundred years ago by Manksmen who knew no other tongue than *Chengey-ny-Mayrey*, the mother tongue. As neither Irish Gaelic nor Scottish Gaelic has any form of literature that can be regarded as similar to the Manx Carols, it may naturally be expected that the study of those Carols will afford amusement as well as instruction to Celts everywhere.

Some one has not inaptly remarked that the Isle of Man is "a kingdom within a kingdom". Apart altogether from the political vicissitudes which have passed over Man ; apart from the marvellous tenacity with which Manksmen have adhered to their independence and peculiar constitution, though they had to bear the sway of many rulers ; it has to be

maintained that accessible to every Manksman there is now a large and varied amount of purely native literature. Through the praiseworthy and patriotic liberality and diligence of the Manx Society which was established in 1858, the archives of Manx learning have been investigated, and much at least of all that is best and most inspiring in the literary records of other days and other times has been given to the world in a clear and attractive manner. Manksmen as well as Scotchmen have their Auld Language.

Three armed legs form the present armorial bearing of the Isle of Man. It was Alexander III. of Scotland, who after he had annexed the Isle of Man to his possessions in Scotland, substituted the quaint device of the three legs with the motto, *Quocumque jeceris stabit*, for the ancient armorial ensign of the island—a ship in full sail, with the motto, *Rex Manniae et Insularum.*

In Mona's Auld Lang Syne, these manful strains are found :

Shall Mona's House of Keys be hurled
By strangers' foul design,
From the foundation where it stood
Since auld lang syne?
No ! while the sea-gull wings his course
Where shoals of herring shine,
The sons shall prop the father's house
Of auld lang syne.
Stabit quocumque jeceris—
Who will not call to mind?
With Governor, Council and the Keys
Of auld lang syne.

Ny Kirree fo-sniaghtey, or the Sheep Under the Snow, is a popular song among Manksmen, dealing as it does with the great danger to which sheep are exposed when heavy snow drifts are formed, in which sheep are often found to be entombed. The Loss of the Manx Herring Fleet in 1787 is a poem which, having to do with the lamentable loss of many lives in Douglas Harbour owing to a tempestuous storm that suddenly arose, has sorrowfully and powerfully affected the imagination of Manksmen since that time. Indeed, it is said that until recently "Manx fishermen made a point of remaining in port on the anniversary of the loss of the fleet, whether from superstition or out of respect to the memory of those who perished, is not known." Mannin veg veen, or The Small and Mild Man or Isle of Man, is a song which, as its name indicates, rouses in the heart of every Manksman affectionate feelings for his native island, and for the songs and customs and traditions of the past. The Manx Carols, along with the patriotic and chivalrous songs and poems which are now

placed before Manksmen, must tend materially to strengthen the tide of reverence for the language and traditions of their native island, and to intensify their zeal for cultivating the tongue and studying the poetry of their stalwart ancestors who inhabited the glens and hills, and defended the homes and liberties of Mannin veg veen, in the generations that have passed away.

Of auld lang syne brave Manx,
  Of auld lang syne,
The sons so brave, the house shall save,
  Of auld lang syne.

THE CELT IN ANCIENT EGYPT AND BABYLONIA.

By John Campbell, LL.D.

[*Read 1st February, 1896.*]

In the Transactions of the Celtic Society of Montreal for 1892, the Rev. Dr. MacNish attributes to me the translation of a cuneiform Celtic document after its transliteration by Professor Sayce. Dr. MacNish's own large share in the work of interpretation he fails, with characteristic modesty, to indicate. The document in question is one of the fortunate discoveries made within recent years at Tell el Amarna in Egypt, where an extensive literary correspondence of Canaanitic, Phoenician, Syrian and Babylonian princes, with the later Pharaohs of the dynasty of the Amenhoteps, was brought to light. These clay letters furnish an important historical desideratum in the synchronism of the Pharaohs with the rulers and governors of north-eastern countries. Probably the most important in this respect is that set forth by my learned colleague. Its text is to be found in the Proceedings of the Society of Biblical Archæology for 1889, Vol. XI, pp. 336–339, where Dr. Sayce describes it as a "large tablet of grey clay, well preserved and clearly written." Of its thirty-eight lines, the first two are in Assyrian or Semitic; the remaining thirty-six are in an entirely new language, which Dr. Hugo Winckler and Dr. Sayce suspect to be Hittite. As these eminent scholars have not yet shewn themselves to be possessed of any clear idea of what Hittite speech was, their suspicion is of little value. Granting it to be simply Turanian, Dr. Sayce makes an admission that is fatal to any Hittite connection of the tablet, when, discussing its contents, he says "the possessive *mi* and *ti*, *tu* have an Indo-European character."

It was no pre-conception on the part of Dr. MacNish and myself that led us to find in the main part of the inscription an ancient form of Celtic speech most nearly approaching old Irish. Our labours upon the Umbrian plates of the Eugubine Tables had given us an insight into the archaic pronominal, prepositional and verbal features of the Celtic tongue, so that a glance was sufficient to make it evident we had before us a purely Gaelic document and no other. There is a vast gap between the date of the Eugubine Tables, 180 B.C., and this Tell el Amarna ablet which goes back to the sixteenth century before Christ, so that there is considerable difference in the language of the compared inscrip-

tions, but the radical characteristics of Celtic speech are manifest in them equally, and lapse of centuries has not so obscured grammatical and lexical forms as to render them untranslatable into the Gaelic of to-day. By its language and by its historical connections the tablet under consideration proves the Celt to have occupied a position of great importance in the early history of the world, when, as nationalities, the purely Aryan peoples can hardly be said to have existed. As the Transactions of the Celtic Society and the Proceedings of the Society of Biblical Archæology may not be generally available, I present Dr. Sayce's excellent transliteration and Dr. MacNish's interpretation of the tablet. Dr. Sayce's proposed Hittite reading I do not reproduce, as it is almost all vaguely conjectural, fragmentary and self-contradictory, in all of which respects it differs from Dr. MacNish's scientifically exact, complete and consistent rendering.

The introductory Semitic lines, leaving out the determinative prefixes, are:—

1. ana Nimuutriya sarru rabu sar mat Miitsri
   to Nimutriya great king, king of the land of Egypt.

2. sa Tarkhuundarais sar mat Arzapiki dhema
   of Tarkhundara, king of the land of Arzapi, the letter.

Hereafter follow the thirty-six lines of the cuneiform text, with equivalents in modern Gaelic (Erse and Scottish), and translation:—

3. kakti mi kuru-in emesmi dammesmi, turmesmi
   h-ugad mi chuirinn ai mas mo damh mas mo tuir mas mo
   unto thee I would place my good lands my good people my excellent generals.

4. nitakh-mes galgal ina pir-mes-mi kurra-mes-mi
   nitheach mas galgadh in fir mas mo gearrain mas mo
   warriors good brave in my good men my good horses.

5. biib-biidmi kurkur-mes-mi gananda
   bithim faoidhim cursuir mes mo go an ionnad anudd
   I am sending my good messengers as far as to thee.

6. khuumuan kuru-in
   comain chuirinn
   favour I would place.

7. duukmas kakta khuumaan kuru-in gismestu
   do chum h-uca comain chuirinn cais mas do
   in order unto thee favour I would place to thy beloved.

8. emesti dammesti turmesti nitakh-mes galgal ina
ai mas do damh mas do tuir mas do nitheach mas galgadh in
thy good lands thy good peoples thy good captains the good warriors brave in

9. pirmesti kurramesti biib-biidti
fir mas do gearrain mas do bi thu faoidh tu
thy good men thy good horses thou art thou sending.

10. kurmesti khuumaan kuru-in gismestu
cursuir mes do comain chuirinn cais mes do
thy good messengers favour I would place to thy beloved.

11. kaalaatami enuun Irsaapa
cuallaidhe mo inneoin Irsapa
annum
my colleague held over Irsapa.

12. Khalugari tsi anmi in auma Akh turrak-ti
Khalugari ti annam in aomadh Akh torog do
Khalugari the prince to me inclining Akk thy princess.

13. udmi kuin dam an Akh upida anzi
udhmaim coinne damh an Akh obadh gus ise (ionn ise)
to enclose wife people to Akh refusing to her.

14. num si liil khuudi Akh an sakdu si
'n aom ise lilim cuadh Akh ionn sochaidhe ise
to incline her follow bidding Akh in her army.

15. kaalata uppa salkhuun 1 sukha tsiliya guskin
cuallaidh ibh sailcunn 1 suacan teallach cioscain
colleague your body-guard 1 pot earthen tribute.

16. kuru an ta
cur ann tu (annad)
places to thee.

17. a Akh ya atta lamu kuun da askha kira a
a Akh ia asad lamuighim coinne da ascaim cear a
who Akh of the land from thee takes a wife asking offspring who.

18. bibi pi raat mu neitta uppa salkhi egir an da
bibh ibh riadh mo innsidh ibh ciollach eagraidheas ionnta (annad)
are you grief my telling your highness enmity to.

19. arad asta Khalugari tsi attiin amme nik tsi
iarradh aisde Khalugari ti aitnim ammain nic ti
asking out of Khalugari prince commanding refuse daughter of the kingdom.

20. Khalugari tsi an egir papara khuudaak
Khalugari ti ionn eagraidhe as fiafruighe a cuiteach
Khalugari prince in enmity ask who denies.

21. nainaat upi andu
inainadh ob annad (ionnta)
need refuses to thee.

22. arad ta upi anzi kidda anzi kuukta turrak ti
iarradh do ob an ise cead an ise cuich torog do
thy bidding refuse to her permission to her secretly thy princess.

23. Khalugari asmi is Khalugari tsi ta
Khalugari asam eis Khalugari ti do
Khalugari I make hear Khalugari prince to.

24. kuistu nik e kar naas aggaas
coisteachd nic ai caram naas aghaiseach
hearing daughter of land stirs assembly quiet.

25. numu antu nin putik asgaas Matyaas ubbiista-un
'n aomadh annad ionn fuaduighim aice gaise Matyaas ibh aisde-un.
adhering to thee to force tribes warlike of Matya you from.

26. zünnuukun khuuma anda
dionasgaim comain annad
dissolving favour to thee.

27. nu Khaate saassa sade Igaid
nai Khaate scuchsaim aiste Igaid
ship Hittite going out of Igaid.

28. naat giskal la biibbi xxx tuuppa khuuntsili
inidhe casgal la bibh 30 taobh caondualach
bowels of ship with it are 30 beams carved.

29. kiissariissi Irsaappa khalu
coisrighim Irsapa geillim
consecrated Irsapa worship (serve).

30. ensukha tsiliya guskin kilalbi tu
aon suacan teallach cioscain geallaim tu
one pot earthen tribute promised thou.

31. xx mana guskin iii kak si iii kak pirkar
20 mana cioscain 3 ceis scic 3 ceis brucur
20 manehs tribute 3 cases ivory 3 cases sponges.

32. iii kak khuuzzi viii kak khusiittiin
3 ceis cuach 8 ceis coiseideadh
3 cases bowls 8 cases gaiters.

33. c kak anna iv dukan c kak khaab
100 ceis ainne 4 tuighean 100 ceis ciob
100 cases rings 4 robes 100 cases tow.

34. c kak sir tsilliya assa
100 ceis sior teallach ase
100 cases long earthen shingles.

35. iv tak kukupu nata v tak kukupu
4 teigh cuachaim natach 5 teigh cuachaim
4 coverings of plaited hair grey 5 coverings plaited.

36. sa kur taba iii tibu xxiv khir gis pana
sa caor dubh 3 dabh 24 cear ceis bheanan
in sheep black 3 cows 24 carcasses pigs female.

37. x gisguza sa giskal istu Sadibbi
10 ceis ceos sa casgal aiste Sadibbi
10 pig hams in vessels out of Sadibbi.

38. x salkhuuz ii giskal tsiliya
10 sail ceos 2 casgal teallach
10 salt hams 2 vessels earthen.

I subjoin Dr. MacNish's free translation of this valuable epistle: "I would place at thy disposal my good lands, my good peoples, my excellent generals, my good and brave warriors among my valiant men, and my good horses. I am, I am sending my faithful messengers to thee, as far as thine abode. I would confer a favour upon thee, in order that by means of them (my messengers) I could gain favour for thy beloved. My colleague Khalugari, the prince over Irsapa, inclines to me to gain Akh, thy princess, for my wife. The people refuse to incline to Akh, and to follow her bidding in the army. The colleague, your body-guard places an earthen pot of tribute (gold) at your disposal—the colleague who takes Akh of the land from thee to be his wife, asking thy offspring who you are. I have grief in telling your highness that there is enmity to thee; forasmuch as thou askest of Khalugari, the prince in command, to refuse the daughter of the kingdom. Khalugari, the prince, makes a request through enmity, though he denies the necessity of doing so. He refuses to do thy bidding, secretly refusing permission to her, to thy princess. I make Khalugari hear. Khalugari, the prince, to obey the daughter of the land, stirs up the quiet assembly that

inclined to thee by forcing the warlike tribes of Matya from thee dissolving their obligation to thee."

"There is a Hittite ship going from Igaid. In the hold of the ship are thirty beams (gods) carved and consecrated, to which Irzapa does homage. There is one earthen pot of tribute (gold) which I promised to thee. There are 20 manehs of tribute (gold), 3 cases of ivory, 3 cases of sponges, 3 cases of bowls, 8 cases of gaiters, 100 cases of rings, 4 robes, 100 cases of tow, 100 cases of long earthen shingles, 4 coverings of plaited grey hair, 5 plaited coverings made of the wool of black sheep, 3 cows, 24 carcasses of female pigs, 10 pig hams in vessels out of Sadibbi, 10 salt hams, 2 earthen vessels."

I do not propose to follow Dr. MacNish in his vindication of the Gaelic of the epistle, which those who are curious can find in the Transactions of the Celtic Society of Montreal. The high reputation of my learned colleague as a Celtic scholar, second to few, if indeed to any, in the world, is sufficient guarantee for the correctness of his translation, with which I have not interfered in the slightest. The task I propose is to place this intensely interesting document in its historical setting by the aid chiefly of monumental evidence. There is no necessity for any research for the purpose of determining who Nimutriya, the Pharaoh to whom it is addressed, was; since all authorities agree that he was Amenhotep III., whose son Amenhotep IV. Khu-en-aten, left Thebes for Tell-el-Amarna, in consequence of his founding a new religion. A princess intimately related to Amenhotep, or Nimutriya, forms the chief subject of Tarkhundara's letter, and her name in its Celtic dress was Akh. Amenhotep III. had no such daughter, but one of his granddaughters, through his son Amenhotep IV. of Tell-el-Amarna, was Ankh, called more fully Ankh-nes-pa-aten. Here, in all likelihood, appears the first clue to the historical connection. On some of his monuments, according to Lenormant, her father is represented in his war chariot followed to battle by his seven daughters, a testimony to their Amazonian character.

Ankh the princess married Tutankh or Tutankh-Amen, who by this alliance became a Pharaoh, and reigned in the legitimate capital, Thebes. Brugsch thinks his reign was a short one, though marked by much development in the arts. In external form Tutankh has nothing in common with either Tarkhundara or Khalugari. We may turn, therefore, in the meantime to the geographical name Irzapa. Dr. Savce supposes this to be a Syrian Razappa or Resheph, because a land of Igadai, which he takes to be the same as the Igaid of the inscription, is, in the Egyptian Travels of a Mohar in Palestine, placed to the north of Aleppo.

I do not believe there is any sufficient evidence to prove that the Mohar was near Aleppo, but this is beside the subject. In the sequel to his Early History of Babylonia, George Smith mentions an Agade near Sippara on the Euphrates, and, further down the river, below Babylon, was Borsippa, a place of great note and high antiquity which gave name to the surrounding country. Even so late again as the time of the geographer Strabo, the chief tribes of Chaldean astrologers were those of the Borsippeni and the Orcheni. It is more natural to suppose that Irzapa is a Celtic form of Borsippa than to look for it as an obscure Syrian district, since its ruler sought in marriage the daughter of a powerful Pharaoh. The voyage of the Hittite ship from the Persian Gulf to Cosseir, the port of Thebes, or to some similar port on the Red Sea, would necessarily be a long and adventurous one, but as there was much commercial interchange between Babylonia and Egypt, it was probably the more common route for it, since deserts and hostile tribes placed difficulties in the way of land transport. The identification of Irzapa with Borsippa is, however, only tentative.

Among all the Babylonian monarchs of note, the only one whose name approaches that of the Egyptian Tutankh is Dungi. Two cities were named after him, Dunnu-saidu and Bil-dungi-ur. He is mentioned in four of his own inscriptions, two of which are votive, on a signet cylinder and on a stone weight of his own time, and is referred to by Nabonidus of the sixth century B.C. as the completer of the tower at Ur, which had been begun by his father. More important by far than Dungi was his father, the remains of whose buildings exceed those of every other Chaldean monarch except Nebuchadnezzar. His name has been variously rendered as Urukh and as Urhammu, and Lenormant, who gives him the latter, identifies him with the Orchamus of Ovid, quoting the verses:

> "Rexit Achaemenias urbes pater Orchamus isque,
> Septimus a prisci numeratur origine Beli."

He and Dungi his son called themselves kings of Ur (now Mugheir) and kings of Sumir and Accad, two distinct peoples. Urukh or Urhammu built at Ur, Larsa, Erech, Nipur, and Zirgulla, therefore over all the region called Orchoene by the classical geographers, a region lying south of Borsippa. The forms of his name, Urhammu, Orchamus, Orchoene, suggest a Cymric Urgan or Morgan, or a Gaelic Breogan, head of the Brigantes, as well as a Midianite Rakem or Rekem. The facts that the Welsh Urgan and Morgan denote the same person, and that the Hebrew *rekem*, variegated, is the Gaelic *breacaim*, I variegate, indicate that modifying prefixes had, as they still have, a large function in Celtic

speech. Such a prefix is the letter t which O'Reilly, in his Irish Dictionary, says "is used as an adventitious prefix to all Irish words beginning with a vowel, which are of the masculine gender, and are preceded by the article *an*, which signifies *the*." By this process, Urhammu or Orchamus became Turhammu, Torchamus, Tarkhun.

Tarkhun is not Tarkhundara, but it explains it, even as the dynastic title of Dungi or Tutankh, for *dara* is a good Gaelic word meaning "the second." Tarkhun-dara is thus an original Tarquinius Secundus. That the legendary story of the two Tarquins was transmitted from the banks of the Euphrates to those of the Tiber can hardly admit of doubt. By a sudden revolution, the cause of which is hinted at in the epistle, Dungi or Tarkhun-dara was driven from Ur, and took refuge not in the Campanian city of Cumae but in Chemi, the land of Egypt. He belongs obscurely to Greek legendary history as a Thersander who never saw Greece, and whose genealogy is all astray, save when Thrasyanor is made his grandfather, but who is rightly made the husband of a daughter of Amphiaraus, for the original of this priestly monarch was Amenhotep IV., called in cuneiform script Naphurkuriya. Final *der* and *tor* in ancient royal names supposed to be Greek must be regarded with suspicion: as a matter of fact, Thersander and Amyntor are Celtic dynastic titles. Once more Tarkhun-dara, Dungi or Tutankh, appears in Greek mythology. As Tarkhundara married Akh, and Tutankh the Egyptian Ankh, so Tithonus was the husband of Eos, who bore to him the Egyptian Aemathion and Memnon. She is called the daughter of Hyperion and Theia, a statement mingling truth and error, for Hyperion, the solar deity, is but a form of Naphurkuriya, the name of her sun-worshipping father, and Theia is her grandmother Thi, the Celtic spouse of Amenhotep III.

Many ancient writers, from Homer and Hesiod onwards, make mention of her son Memnon, who has no place in the Egyptian dynasties. His double connection with Egypt and Ethiopia, and with Susa, where his father Tithonus is said to have reigned as the viceroy of the Assyrian king Teutamas, shews that the birth of Tutankh in the Euphratean region was well known, and that he was connected with the Thothmes, not of Assyria but of Egypt, who were closely related to the Amenhoteps, although, by an error of judgment on the part of most Egyptologers, Amenhotep III. and IV. are set down later than all the four Thothmes. Tithonus is generally called a son of Laomedon of Troy, but Apollodorus makes him the son of Cephalus and the father of Phaethon. The original Troy, whether Homer knew it or not, lay between Babylonia and Egypt, and thither Memnon is said to have come from the banks of the

Euphrates to help Priam and the men of Ilium. While Cephalus, the name of the father of Tithonus, is but Hyperion and Amphiaraus, his father-in-law over again, Laomedon and Phaethon are one. Ulam-Buryas was a Babylonian king and a cousin of Urukh or Urhammu. His son Ulam-Bedan, or in Celtic and Semitic as opposed to Turanian order, Padan-Ulam, was at once the Laomedon and the Phaethon of the Greeks. Bedan or Padan, the ancestor of the Patinians, and at the same time the original of the British Bladud or Badud, who built Caer-Badus or Bath, and, like Phaethon, attempted to fly to heaven, was the second cousin of Tarkhundara, Dungi, or Tutankh. As Tithonus, the latter is the German Tannhaüser imprisoned in the Horselberg, and True Thomas in the coverts of Ercildoune, as Sir George Cox has demonstrated, but, in Geoffrey of Monmouth, he is also Caradoc's brother Dianotus, king of Cornwall, whose all attractive daughter Ursula invites comparison with the Horselberg and Ercildoune. Thus world-wide was the fame of the really Cymric or Sumerian, but Gaelic writing, Tarkhun-dara.

The marriage of Akh with Tarkhun-dara was far from being the first alliance between the Babylonian and Palestinian Celts and the Pharaohs. Thi, the wife of Amenhotep III. and mother of Amenhotep IV., was a relative of Tushratta, king of the Mitanni or Midianites who dwelt between the Euphrates and the Jordan. When on a hunting expedition in his country, the Egyptian monarch met her and made her his queen. The monuments represent her "with light hair, blue eyes, and rosy cheeks, like the women of northern climates." Her name, in the form Tea, occurs more than once in ancient Irish history, and she was the original Greek Theia. Her mother was Tuaa, daughter of Amenhotep II., and her father is called Iuau. This peculiar Egyptian dress hardly conceals a Celtic Hugh, which appears among Mitannian or Midianite names as Eui or Evi. Here again we have to deal with no obscure man. A son of the second cousin of Tushratta (who, by the way, was no less a person than the Greek Adrastus), he was the Iva or Shamas-Iva, who, with his father Ismi-Dagon and his brother Gungunu, not only ruled over the greater part of Babylonia, but brought Assyria also under their sceptre. They likewise called themselves kings of Sumir and Accad, and asserted sovereignty over Ur as well. These proud Babylonian monarchs, whose alliance the Pharaohs eagerly sought, must have been those whom Berosus comprised in his Median dynasty, the name Median being then, as it probably was later, synonymous with Midianite. In the sixteenth century B.C. they were almost supreme. The following table, in which the Celtic members are printed in capitals, indicates their important position :

ISMI-DAGON. Amenhotep II.

GUNGUNU SHAMAS-IVA = Tuaa

THI = Amenhotep III.

Neferit-thi = Amenhotep IV. URHAMMU

Ankh = TUTANKH.

Other tablets from Tell-el-Amarna furnish the names of four Mitannian kings or chiefs in three generations, the last of which was contemporary with the Amenhoteps III. and IV. These are Tushratta and his brother Artassamara, their father Satarna, and their grandfather Artatama. Of these, Satarna connects with ancient Irish history in the person of Stairn, called the son of Nemedius or Midian. This he was not, but he must have been very nearly related to Ephah or Gephah, Midian's eldest son. A son of this Gephah heads a Pharaonic dynasty older than that of Tutankh. He is Senta, who is found at the end of the second dynasty, and his real successors are Menkau-Hor, Tatkara, and Assa of the fifth, although Egyptologers erroneously place six hundred years between them, and represent Tatkara and Assa as one person. That other Pharaohs were of the same Celtic stock is very probable, but evidence to prove it is yet lacking. Proceeding, for lack of a better, upon the chronology of the Hebrew Scriptures, the date of Senta's monarchy in Thinis or in Elephantine may be placed between 1800 and 1750 B.C., instead of in 4000 B.C., as fixed by Lieblein. The period of Tutankh, the last purely Celtic Pharaoh, was not far from 1580. The two centuries that lie between the extreme dates represent the Golden Age of the Celt, the time when his mythology and legendary history were formed. Fingal and Ossian, Aneurin and Taliesin never saw the British Islands, but somewhere between the Tigris and the Nile performed the deeds and sang the songs of the days of old, when Shamas-Iva or the Egyptian Iuau was a man whom their descendants converted into Hu, the sun-god.

There were other Celts ruling in Chaldea besides the dynasties headed by Ismi-dagon and Urhammu. I have already mentioned that of Ulam-Buryas and his successors. Closely related to it, although Celtic only on the mother's side, was that of the Kurigalzus and Burna-Buryases, who were Ossianic Trathalls and Brians, half Hittite and half Cymric, although the Hercules like Kurigalzu left his name to Argyll. Of the same stock was Khalugari of the tablet, for he was a late Colgar, named after the brother of Cumhal and Brian, if indeed he were not the

same man. Also the brother of the Egyptian Menka-Hor, son of Senta, was Singasit, called the son of the lady Belat-Sunat, who ruled in Chaldea at Urukh or Warka. A Welsh Mabinogi mentions his mother as Bleiddan Sannt of Glamorgan; but, *mirabile dictu*, he is no other than the Hengist of British story, and his Egyptian brother is its Horsa, no Saxons at all, but most genuine Gaels. To Vortigern and Vortimer they were foreigners, however, for these monarchs were of Hittite race.

The Egyptian monuments have preserved for us the names of four Hittite army leaders who are as Celtic as any of the foregoing worthies. Brugsch calls the first of these, who was a son of Ulam-Buryas and thus a cousin of Tutankh, by the varying names Sapalili, Saplel, Saprer. An Assyrian form of the same Patinian name was Sapal-Ulme, and its Hebrew equivalent was Achbor-Ulam, in Ossianic language Cairbar of Ullin. His son Mauro-sar was the original of the Greek Meleager, famous in the story of the Calydonian boar, which received its geographical name from Zimran's son, the ancestral Gilead. And his son Mauthanar, by simple inversion of the parts of his name and a common dental change, becomes Near-mada or Diarmaid, the hero of the Irish boar hunt and the supposed mythical ancestor of all the Campbells. After his death his brother Khetasar made peace with the great Rameses and gave him his daughter in marriage. Who stands for Khetasar in Celtic tradition I have not yet found, but, in Herodotus and elsewhere among Greek writers, he is Cytissorus, the last of the dynasty of Phrixus, which Phrixus was Buryas or Peresh, the son of Gilead, and father of Ulam and Rakem.

The list of distinguished Celts of monumental antiquity which I have furnished is far from exhaustive. It comprises five Pharaohs only, and these by no means the greatest. The great Egyptian monarchs were Hittites, with the exception of the Thothmes-Rameses, who were of Horite or Phoenician descent. But the Celtic Pharaohs were very religious, from the divine Senta down to Prince Ptahhotep, the son of Assa, who wrote a book of moral precepts. The latter was a Welsh Eudav, Latinized by monkish chroniclers into an Octavius. He, however, was not the Eudav who gave his daughter in marriage to Maxen Wledig. That Eudav was Iuau or Shamas-Iva, whose daughter Thi married Nimutriya or Amenhotep III., a Hittite Pharaoh of the Kenezite line to which Caleb the son of Jephunneh belonged. His Hittite name was Meonothai or Megonothai, and he is at once the Maxen and the Manawyddan of Welsh tradition. What the Celt lacked in Egypt he made up for in Babylonia and even in Assyria. There the Cymro or Sumirian came first, and the Accadian or Hittite second. Look up the twentieth cut in George Smith's Chaldean

Account of Genesis, entitled "Migration of Eastern Tribes from early Babylonian Cylinder," and in the central figure you will find a typical bearded Gael in kilt and plaid and bonnet. The Celt was dominant on the Euphrates and the Tigris. The haughty Hittite Sargons and Hammurabis had to make Sumirian alliances or perish. Ismi-dagon, the great conqueror of Assyria, with his sons Gungunu and Shamas-Iva, attained imperial power, while their relatives Satarna and his son Tushratta dominated Mesopotamia and Syria, and the dynasties of Buryas, Singasit, and Urhammu ruled Chaldea. In Canaan itself the Hittite Confederacy was fain to call in the aid of Celtic skill and courage, and virtually make kings of the Saprers, Maurosars, and Mauthanars, who fought their battles against all the might of Egypt.

To the student of ancient history the story of the primitive Celt is invaluable. It cuts down the fabulous antiquity of the Egyptian and Babylonian conjectural historians; it reveals the contemporaneousness of monarchs falsely separated by centuries; it discloses the identity of Egyptian Pharaohs, such as the Thothmes and Rameses, placed far apart in different dynasties; and it withdraws so called myth from the realm of mystery into that of perverted history. The Celt was a half-breed, but of the noblest kind. His father was the Semitic Abraham, his mother, the Perizzite princess Keturah of the purest Aryan race. Zimrite and Midianite, Sumirian and Mitannian were the names by which he was known, names that he rarely disgraced. Like the Hittite, he fell upon evil days when the Horite or Phoenician Thothmes-Rameses became supreme in Egypt, and when Israel at a later date scattered his squadrons; but, when the Aryan first reasserted himself, it was in his Medo-Persian person, and that new supremacy the Aryan keeps to-day, through all the Latin nations and even in many that are Germanized and Sclavized, through the inborn vigour of the Celt.

A great difficulty in the way of recognizing the historical characters of the monuments in ancient Celtic history is the fact that much of that history was originally composed from a non-Celtic or Turanian standpoint, and doubtless in a Turanian language of the Iberic or Pictish division. In British tradition, the illustrious names of Arthur, son of Uther Pendragon, and of Emrys Wledig, or Aurelius Ambrosius, denote genuine historical personages but Turanians, and the same is true of the Irish Gadel, Heber Scot, and Milesius, and of the Ossianic Treinmore, Gaul MacMorn, and Cormac. Even the sons of Treinmore's celebrated son, Trathall, were only Celtic on the side of their mother, who was a sister of the Babylonian Urhammu and Ulam-Buryas. On the male side they were descended from the famous Sargon of Agade, who was the father of Trein the Great, known as Harum or Naram on Sinaitic

and Chaldean monuments. Yet it is more than likely that Brian, Cumhal and Colgar spoke their mother's Celtic language, although so far the name of the latter only, as Khalugari, appears in a Celtic document. There are Chaldean inscriptions of his brothers, who are called Burna-Buryas and Bel-Samu, of which latter Cum-hal is an inversion. They connect locally with Zirgulla and dynastically with Kurigalzu, who is Trathall. The Celtic army leader of the Hittite confederacy, whom the Egyptians called Saprer, has a fragmentary Babylonian record now in the British Museum in which he is termed Isbi-barra, king of Karrak. There may have been a Karrak in Chaldea, but his city was Kerak, in what afterwards became the land of Moab, and near it, towards the Dead Sea, not in any part of then unknown Asia Minor, lay the Ilium which Tarkhundara's son Memnon came to help when besieged by Agamemnon or Shimon, the valiant nephew of Rameses the Great. Classical writers say that Isbi-barra's grandson Mauthenar, whom they call Antenor, deserted his country in her hour of need and fled to Italy, but universal Celtic tradition, whether it call him Morvid or Diarmaid, represents him as perishing in a desperate but unequal contest with a huge monster, a trope, perhaps, for the giant power of Egypt.

As illustrating the vitality of ancient tradition, and at the same time its corruptions in the process of transmission, it is worth while comparing the lists of the sons of this great commander or generalissimo of the Hittites as preserved by the classical and Celtic historians. Antenor is said to have had nineteen sons, but the Iliad celebrates only seven. Geoffrey of Monmouth gives Morvid five; and I have succeeded in finding no more than three sons of Diarmaid, to whose number I add the names of two of his grandsons, Blathmac and Maolodhar. Leaving out Acamas, son of Antenor, who has no parallel in the other genealogies, there remain six classical names to compare with two Celtic groups of five each. It is to be remembered that a Greek Agenor is the same as a Sanscrit Agni, the *or* being an unnecessary increment, that r and l are interchangeable as are b and m, and that any radical diversity in an initial consonant may in some cases be explained as the result of prefixes, the original significance of which is now lost. Thus a son of Bellerophon is called Isandros and Pisandros, and the wife of Telamon bears the names Eriboia and Periboia.

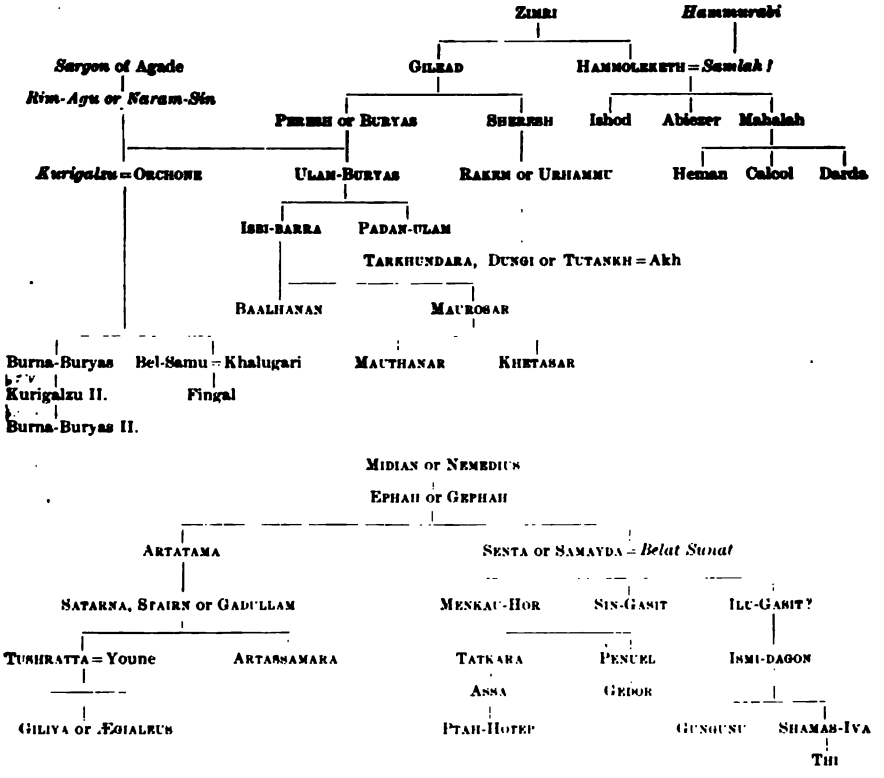
SONS OF ANTENOR OR MAUTHENAR:
Archilochus Polydamas Polybus Agenor Helicaon Laodocus.

SONS OF MORVID OR NAR-MAUTH:
Arthgallo Peredure Gorbonian Vigen —— Elidure.

SONS AND GRANDSONS OF DIARMAID OR NAR-MAUTH:
Breasal Blathmac Colman-beag —— Hugh-slaine Maolodhar.

No monument so far discovered contains these names, but, when the Turk is out of the way and a strong government keeps the Bedouin in check, valuable relics of ancient Celtic life may be looked for in the excavation of Kerak and neighbouring sites in the historic land of Moab, which witnessed the slaughter in cold blood of a hundred thousand Gaelic mothers and their male children at the command of Israel's great law-giver, Moses. In the battle which preceded that massacre, five kings of Midian were slain, Evi, Rekem, Zur, Hur and Reba. This terrible defeat and massacre put an end to the Golden Age of the Celt, and his subsequent overthrow by Gideon, two centuries later, effectually checked his career of conquest.

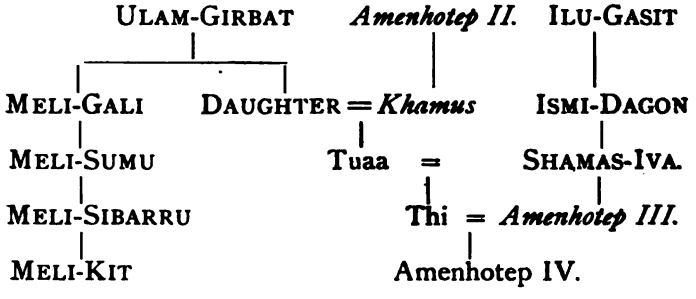
The subjoined genealogical table gives the names of the great leaders of the ancient Celts, in the Cymric and Nemedian lines, in capitals, the half-castes in ordinary text, and their purely Hittite ancestors in italics:



It is evident that the generations were of very unequal length, since Thi, who is in the seventh Mitannian, was the grandmother of Akh, who married Tarkhundara in the fifth Zimrite or Sumerian proper. A reconciliation may be found in the long reign of Urhammu, and in the

Tithonus and allied traditions which represent Akh's husband as an old man.

Since the foregoing was written, I have discovered a series of Babylonian kings of Celtic birth, pertaining to what is called the Kassite Dynasty. The first of these is Ulam-Girbat, or, more properly, Girbat-Ulam. He, like Tushratta and Artassamara, was a son of Satarna, but acquired the name Ulam by marriage into the family of the Cymric Ulam-Buryas. In the Tell-el-Amarna Semitic letters he is called Rib-addu, and his son Meli-Gali is termed Malchiel. The successor of Meli-Gali was Meli-Sumu, a Celtic Mail-gun or Malcolm, and his was Meli-Sibarru, a Mulciber, followed by Meli-Kit. In classical mythology, Girbat is no less a personage than Sarpedon, the son of Asterius and Europa, Asterius being his father Satarna, and his brother Artassamara being Rhadamanthus. The daughter of Girbat married Khamus, the son of Amenhotep II., of Egypt, and the offspring of this union was Tuaa, the wife of Shamas-Iva, and mother of Thi.



THE SEASONS, HUDSON'S STRAIT.

BY F. F. PAYNE.

[*Read 28th March, 1896.*]

With the object of testing the feasibility of a much talked of steamship route from certain Hudson's Bay ports to Europe *via* Hudson's Strait, in 1884 an expedition was equipped by the Dominion Government and dispatched to these waters with instructions to establish observing stations at several prominent points along the route, where the movements of the ice, the direction of currents, and the rise and fall of tides could be noted; also with the object of collecting full information bearing upon the climatology of the neighbouring shores. These stations were seven in number, five of which were in Hudson's Strait, and the observations, begun in the autumn of 1884, were continued uninterruptedly to the autumn of 1886, the reports of the observers, containing much valuable data, being published in the blue-books of the Department of Marine and Fisheries.

Although the Eskimo informed me that, with the exception of the summer of 1884, which was unusually cold, the seasons during which the stations were maintained were normal, it is quite possible that had the meteorological observations been continued for a much longer period the averages deduced from them might have shewn a slight difference from those found; on the other hand, however, when considered with the growth of plant life and other terrestrial changes, of which the Eskimo are keen observers and volunteered much information, a very fair approximation of the weather obtaining during the seasons can be arrived at.

If a native of the tropics, and one say of Florida, and another of Ontario, were transported for a year to Hudson's Strait, their verdict as to its seasons would doubtless be very different. The former would probably say, winter, everlasting winter, while the second might admit that at least there was summer and winter, but I think the last after due consideration would agree with me that in Hudson's Strait, as in Ontario, we have the four seasons, though in a very much modified form; for who, after long watching, when he sees the first flowers, the arrival of the first birds and other emblems of spring, will say there is no spring? Who, too, will say, when seeds are ripening and the bee goes

humming by as he basks in the sunshine, and the birds are seen teaching their young, this is not summer? And when the leaves are changing colour, the seeds from their pods are falling, and the birds are hurrying southward, surely this must be autumn? These then and many other scenes indicative of the seasons were noted, and we shall now endeavour to describe them under Spring, Summer, Autumn, Winter.

Spring.—Probably the first sign of approaching spring is the change that takes place in the colour of the many coloured lichens which cover the rocks, and although the temperature is below zero every day, this is distinctly seen in March, the green coloured species becoming much brighter under the quickening influence of the sun. This, however, is a long way from spring, but it is hailed with joy by the Eskimo, as they also hailed the first snowbird on April 1st, when the average temperature was still below zero; and later still, on May 3rd, the full-grown caterpillars seen crawling upon the rocks when the temperature was ten degrees below freezing. These larvæ were evidently quite accustomed to frost, and although becoming stiff and hard when frozen, they were soon quite lively when allowed to thaw. A few specimens were kept in hopes they would in time change to the moth or butterfly state, but every one of them was infested with a parasite, and instead of their pupæ bringing forth butterflies they were found to be only aids to the metamorphosis of a common fly, three or four of which, looking somewhat ashamed, escaping from each carcass and flying away.

From May 1st to 15th the temperature, though occasionally rising above the freezing point, was still below the average, and excepting the willow, which creeps for protection under the moss, throwing shoots out only a few inches above, on which the buds were now much swollen, there was little sign of life. On May 13th, the temperature being about 38°, a number of flies were seen; this, however, was followed by some cold days, and it was not until May 20th that any distinct sign of spring was noticed. At about this date there was a marked rise in temperature and immediately everything sprang into life, no less than thirteen different species of plants showing distinct leaf-buds five or six days later, including *Antennaria alpina*, *Ledum palŭstre*, *Diapenzia Lapponica* and others. These of course are of the more hardy plants and were not much affected by frost or the snow which continued to fall in 1886 up to June 17th. On May 29th of the same year the depth of snow on the ground was estimated at seven inches, and although often added to it was quickly melted, and this estimate included many drifts twenty feet deep or more, while over large level areas exposed to the sun there was little or no snow. Simultaneously with this sudden start in plant life a

number of birds varried and almost immediately were seen mating. These included the shore lark, water thrush, stone chat, rough-legged buzzard and others; the only insects to be seen, however, on the last day of May were a few spiders and flies.

Turning our attention seaward we see a very different scene from that presented on shore. Throughout the month of May the ice, now somewhat honeycombed and much broken outside the smaller bays, is floating back and forth under the influence of the winds and tides, sometimes leaving a belt of open water round the shore several miles in width, and then, with a change of wind, returning in a compact mass, the pans being from a few feet to several acres in area. Upon this ice may often be seen great masses of stone, gravel, seaweed and plenty of dead vegetable matter, and when met with far out upon the Atlantic this appears as an extraordinary phenomenon; a short stay on shore, however, soon dispels this wonder, for here we see the crumbling cliffs in springtime letting loose huge pieces of rock upon the ice below, the winds and rivulets depositing loose shrubs and moss, and the rising tides overturning great blocks of ice with stones and seaweed adhering.

From the end of May to about the middle of June is a very short period, and yet we see some marked changes in vegetation. The snow, with the exception of a few deep drifts that will never melt completely, has now nearly gone, and although a fresh fall often occurs, and the temperature still occasionally falls to the freezing point, it has reached as high as 45° and has averaged about 37°, the sky being overcast for nearly two-thirds of this period. On June 15th twenty or more different plants were in leaf and two were in full bloom; the snowbird, ducks and gulls were nesting, and it is probable all the birds that migrate to these regions had arrived; the only insect seen, however, besides the spider and fly, was the bumble bee.

Up to this time the Eskimo have not been considered, having been noticed in a former paper. It may be of some interest to know, however, that a June sun also has its effect upon them, and the young lord of this sub-arctic wilderness may now be seen casting a meaning glance towards some dusky damsel, which is just as quickly returned and often with interest, for catching one of these lords means a more plentiful supply of food, and although it is done under the intoxicating influence of the season, it is quite legal.

Between June 15th and 30th there was a noticeable improvement in temperature at Cape Prince of Wales; light frosts occurred only twice, and once 60° was registered, the days being pleasant and the nights cool, while the average temperature was about 39°, the last snow of the season

falling on the 17th. During this period, vegetation, and in fact all animate life appeared to make wonderful growth, twenty of the sixty-five different plants collected being in full bloom by the end of the month, and many birds had now settled down to their work of incubation. The small lakes, too, were just open, and the loon with its melancholy call could be seen industriously diving for fish, and on the last day of June two different butterflies were taken. Over the sea the ice, though much softer, has remained generally compact, but along the shore and in the small bays it is fast giving way. At the eastern and western entrances of the Strait the average temperature for June, which is about 32°, is apparently slightly in excess of that in the central part, owing, doubtless, to the contiguity of the warmer waters of the Atlantic and Hudson's Bay, and it is about 30° less than the average at Toronto.

Summer.—The first day of July may be considered the first day of summer, and taking a survey of the month on the last day, some interesting changes can be recorded. The temperature has fallen to the freezing point on four or five days, but the frost has not been sufficient to endanger vegetation, while it has often risen to between 50° and 60°, the highest recorded being 68° on the 18th day, this being the maximum for the month and year, and 31° the minimum for the month only. The sun for some time has been rising in the N.N.E. between 2 and 3 A.M., and setting in the N.N.W. between 9 and 10 P.M., and the sky presents the same appearance during the intervening night hours that it usually does in lower latitudes just before sunrise, often glowing red and bright golden. At all hours it is as light as it is in Ontario immediately after sunset, this being an important factor in considering the navigability of the Strait.

By the middle of July all the plants excepting two, *Matricaria inodora* and *Ranŭncŭlŭs hyperboreŭs*, which were in bloom on the 28th, had bloomed, and now, wherever there was sufficient earth to support plant life, purple, blue, yellow and white flowers were to be seen in profusion.

Early in June, by way of an experiment, some garden seeds were sown, and on the 22nd of that month I find the following note in my journal: "Of the peas, turnips and spinach sown in open ground the two former are thriving whilst the latter does not seem inclined to grow, a few seeds only having germinated. Of spinach and garden cress sown under glass, the former is doing well whilst the latter, though half an inch in height, is withering." On July 7th there is also this note: "The peas, turnips, spinach and cress have made no perceptible growth since June 22nd." Excepting the cress which grew a little after this date there was no perceptible growth, and towards the end of the month all the plants withered.

During July, 1886, the prevailing winds being N.E. in the western entrance of the Strait and E. elsewhere, doubtless much ice drifted into Hudson's Bay, and was there melted. These winds, which probably often inclined to northward, tend to pack the ice on the south side of the Strait, leaving periodically wide stretches of open water on the north side, and this is doubtless of frequent occurrence at this time of the year, as ships entering Hudson's Bay always keep to the north side of the Strait. Although these ships are often caught and held fast in the pack for a short time, upon the ice becoming loose they are again able to move on. The sun by July 20th being quite warm and the temperature of the water increasing, the ice is much honeycombed, and upon the ice-pans may everywhere be found pools of perfectly fresh water from which passing ships take their supply. By the middle of July all the small bays were open, and once more, when they were not packed with drifting ice, as often occurred, the welcome sound of waves could be heard breaking upon the shore. By July 22nd, 1886, all the ice had become generally very open, and although often packing tightly with a strong wind and probably an opposing tide, it would soon open again, and fifteen days later there was little to be seen at Cape Prince of Wales, while elsewhere the remaining ice was widely scattered.

Returning again to the land on July 15th we find the young of four or five different birds already fledged, including the snow bunting and shore lark; the fox, hare and lemming have assumed their summer garb; salmon and trout have been for several days ascending the streams to their spawning beds, and all are enjoying the warm sun to the full. Upon the shore in the little pools of water and among the seaweed left by the receding tide a variety of marine life may be found, including several kinds of fish, muscles, clams, shrimps, anemones and large jelly fish. None of the fishes, however, show as much vitality as those of the same species in lower latitudes, and most of them were very easily caught with the hand. The Eskimo at last look happy, and as seals and the white whale are plentiful they are all quickly growing stout and lazy, spending much of their time basking in the sun. Insect life is now at its extreme height and includes several different kinds of butterflies, of which the *colias* are the most numerous, moths, bees and mosquitoes, the latter being about as numerous as the sands of the shore. Fortunately these pests only become troublesome on warm days and then only in the sunlight, being delightfully quiet after the sun goes down. Upon cold cloudy days the bumble bee only would be seen on the wing.

On July 30th, at Stupart's Bay, or Cape Prince of Wales, the ground was found to be frozen at a depth of 48 inches, this probably exceeding

somewhat the depth at the western entrance of the Strait, as frozen ground was there found at a depth of 27 inches on July 17th, both measurements being in sand well drained and well exposed to the sun.

The average temperature for July at several points does not differ much, being about 40° in the western end of the Strait and 42° elsewhere, this being about 26° less than the average in Toronto. Fogs are very much more frequent in July than at any other time of the year, a total of 147 hours or about six whole days being recorded in 1896 at Cape Prince of Wales. These fogs, however, do not very often extend to the land, being confined mostly to the Strait where the warm winds from the land are quickly cooled to the dew point by contact with the ice. The number of hours of fog in the whole year 1885-86 was 606, against 1992 hours in the Straits of Belle Isle. The rainfall for the month of July was very small, being only .39 inch, or 2.61 inches less than the average in Toronto, and although a greater rainfall was recorded at other parts of the Strait, it was everywhere considerably less than the Toronto average. Thunderstorms evidently seldom occur, only two being noted during the year 1886. The average amount of cloud is considerably less in the winter and more in the summer than in Toronto, where the average for the year is slightly in excess.

From the 1st to about August 25th, when summer may be considered as over, there is not apparently much increase in the temperature; it is, however, far more steady, frosts becoming much less frequent and the range less; nevertheless cold cloudy days occur, when all insect life disappears as if by magic. The seeds of nearly all the plants collected ripened early in August, and excepting two, the seeds of which were not ripe until about September 5th, all had ripened by the last week in August. By about the middle of the month it is probable all the young of the birds breeding on the shores of the Strait were fledged, and a little later several had doubtless gone southward as they were not again seen.

The average temperature for August, 1896, was 43°, or 23° less than the average in Toronto. The direction of the wind was respectively between N. and W. at Cape Prince of Wales, S. and W. at Cape Chudleigh, and N. and E. at Nottingham Island. The rainfall generally was about 2.5 inches, or rather less than the average in Toronto, it being considerably less at Stupart's Bay.

The temperature of the sea averaging about 34° or 35° during the first fifteen days of August, much of the remaining ice is doubtless melted, and although the bays are often filled with drift, more especially in the western end of the Strait, there is not enough to affect the temperature of the air, and this is doubtless the principal cause of the small range on

land, making it the most enjoyable part of the year. By August 19th, 1896, all the ice in the Strait had disappeared, excepting an occasional small Fox Channel berg, which continued to pass slowly to the eastward until winter again set in. These bergs, being very deep in the water, are doubtless carried eastward by a steady undercurrent which apparently affects the surface ice but little, and is probably quite of secondary importance in considering the navigability of the Strait.

Upon several days in August when the the temperature rose to 60° or 65°, it was rather amusing to see the Eskimo thoroughly exhausted with the heat, the perspiration pouring down their faces, and presenting much the appearance of people in Ontario when the temperature is up in the nineties; they could not understand how we could appear so cool under the circumstances. These happy days for us when it was possible to sit watching the bright blue sea, the many sea-birds, the green valleys, dotted with flowers, and hear the busy bumble bee as it circled round two or three times and then went buzzing away, did not last long. By the 15th day nearly all insect life had passed away, and by about the 25th summer was over and autumn had begun.

Autumn.—The first sign of this season of decay and probably the saddest, is the drooping of the dying plants; in this region, however, it is soon all over. On August 20th two or three species had succumbed, ten days later a large number had assumed their autumnal tints and were withering, and by September 12th, nearly every plant noted had ceased to show life or was quickly withering. Nevertheless, in spite of frequent light frosts, the temperature often rose during this period to about 50°, although it was more often from 40° to 45° during the day and somewhat lower at night. The highest recorded in September, 1895 (to which year we have to refer from this onward), was 47°, and the lowest 5°, the average for the month being 33°, or 26° less than the average in Toronto. There was but little difference in temperature at other points in the Strait, Cape Chudleigh only being slightly higher.

On September 2nd wild geese were flying southward; on the 7th the ground was frozen; on the 14th snow fell, and a few days later there was ice on the small lakes a quarter of an inch in thickness; dates and observations agreeing with those at other points within two or three days. These uncomfortable signs of approaching winter, were only signs, however, for during the greater part of September there were many enjoyable days when the snow would completely disappear and the air would feel comparatively warm. The frosty mornings that now so often occurred had a stimulating effect upon the Eskimo, and those who had

been taking life easily during the summer were now doing their best to lay in a supply of provisions for the winter.

By September 25th autumn is quite over, excepting at the eastern entrance of the Strait, where it may possibly be delayed to the end of the month, although much hard frost will doubtless occur before that date, all lakes there being frozen over on the 26th. These last days of autumn are anything but pleasant, and to the Eskimo they are almost misery, for the snow being too soft to make winter igloos or houses they are compelled to reside in their seal-skin wigwams which cannot be sufficiently heated with their lamps.

Winter.—In entering upon the season of winter in sub-arctic regions how very different is the feeling to a new-comer from that which affects him on his arrival upon the scene in summer! If he has a boat he feels that by coasting long enough he may reach some traders' post, or should his provisions be exhausted or stolen by the starving natives he may shoot enough to support life. In the winter it is not so, for then even the Eskimo will not travel any great distance, all their long journeys being undertaken in early spring; and with numbers of half-starving natives following him everywhere and perpetually begging for food a feeling of helplessness takes hold of him that is often hard to shake off. As the season advances and the silence, so well known to travellers in these regions, increases, when nothing can be heard but the groaning and moaning of the great masses of ice under the influence of the ever-changing tides, one is more or less inspired with a feeling of awe to which he does not for some time become accustomed.

A few birds, such as hawks, snow-buntings, ducks, gulls and guillemots, lingered until the first week in October, the last being seen as late as the first week in November, and on occasional bright days early in October a few flies would be seen. With these exceptions, however, after September 1st there was little sign of life, most of the larger animals, such as the fox and wolverine, being still inland. Looking seaward at Cape Prince of Wales the prospect was brighter; here might still be seen the white whale, walruses and seals sporting in the blue water until quite late in October, when ice once more formed in the bays. This shore ice would often break up and drifting out to sea would help much to smooth the open water which on calm nights would also often freeze. A fresh wind then occurring all the ice would again be broken up, and it was not until large masses of Fox Channel ice had crowded into the bays about November 30th that the water in them became permanently frozen.

In 1884, in the western entrance of the Strait, there was much Fox Channel ice throughout the summer and autumn; elsewhere, however

there was little or none after August 25th. By October 2nd it had closed in upon Nottingham Island and soon after an eastward movement set in. Early in November it was visible at Cape Prince of Wales and continued to drift backwards and forwards, packing mostly on the north shore. At Cape Chudleigh some Davis Strait ice was doubtless driven in by the prevailing easterly wind, as it was generally compact by November 8th.

In 1885, when, according to the Eskimo, the season was normal, the ice was compact at Nottingham Island on Oct. 3rd, at Cape Prince of Wales on November 14th, and Cape Chudleigh on November 23rd. From these dates onward until about the end of December, 1885, the ice would often be quite open for a short period, the changes being apparently dependent altogether upon the wind and tides. After January 1st, until spring, it increased in compactness, and only occasionally when strong winds occurred would any open water be seen. In all cases the open water would very soon be frozen over, the ice thus formed being in turn broken up by the encroachment of the heavier ice upon it.

With the approach of winter the long nights appear, and daylight becomes very precious; on October 17th lamps were lit at 4.40 P.M., on November 20th at 3 P.M., and on December 21st at 1.30 P.M. Fortunately the moon does not treat these regions in the same way as the sun, and with the help of the aurora, which may be said to occur on at least four days in ten during this season, the long absence of daylight does not appear such a hardship as might be supposed.

Owing to the presence of the water of the Strait, the temperature does not fall so low as it would many miles inland to the southward, the lowest recorded during the winter of 1885-6 being 45° below zero, while 65° was registered at Fort Chimo, Ungava Bay; nevertheless, the average winter temperatures are unpleasantly low, more especially at the western entrance, where, in 1885-6, the means for the months December to March, inclusive, were respectively, -6.6, -24.4, -26.2, 11.0. At Cape Prince of Wales they were four or five degrees higher, and at Cape Chudleigh, the figures given for the same months are respectively, 4.8, 11.5, -10.4, 0.1, showing a marked difference, this being doubtless owing to the contiguity of the Atlantic Ocean.

Blizzards occur rather frequently, and then it is impossible to face the wind without fur clothing; on the other hand there are many calms when the cold is felt but little, and as a rule ordinary woollen clothing was found sufficiently warm. During these blizzards the snow packs very hard and is easily cut into large bricks with which to build the Eskimo's house, and large areas of exposed ground are often left com-

pletely bare. The snowfall generally is much greater in the Strait than in Toronto.

On November 8th the ice on the lakes at Cape Prince of Wales was 20 inches in thickness, on December 14th it was 22 inches, on the 27th, 27 inches, and on April 17th following, it was 72½ inches. On May 3rd, the sea ice in an almost land-locked bay, was 66 inches, this being the maximum of the year.

Much more might be added relative to the various climatic changes that take place during the winter and other seasons; it is to be hoped, however, this short description has at least conveyed some idea of the climate of a district that is undoubtedly destined to become of considerable importance to Canada.

PICTURE-WRITING OF THE BLACKFEET.

BY REV. JOHN MACLEAN, PH.D.

[*Read 17th March, 1894.*]

The natives of the American Continent preserved their legends and traditions through the agency of men who kept an accurate remembrance of them with important historical events by means of wampum records. A more permanent form, however, was needed for the recording of events and conveying them to others, which originated and developed the system of picture-writing. Etchings made upon rocks and trees, pictures painted on the lodges, birch bark and buffalo-robes retained the knowledge of events for future generations. The totem-posts of the Tshimpsheans and the grave-posts of the Ojibways represent one kind of picture-writing limited in its application and yet necessary for recording facts. From the most primitive form of writing has this system developed, in the rough outline or full picture rudely drawn, through a symbolic stage until the perfect stage of writing was produced. In the Ojibway pictography the symbol for lightning is a rattlesnake. Colonel Mallery in explaining this development says:—"It can be readily seen how a hawk with bright eye and lofty flight might be selected as a symbol of divinity and royalty, and that the crocodile should denote darkness, while a slightly further step in metaphysical symbolism made the ostrich feather, from the equality of its filaments, typical of truth." In some of the pictographs the name of a man is made by making the head of a man and then placing the bird or animal which represents his name over the crown of the head, as in designating Chief *Red Crow* (Mikasto) a crow painted red is placed in position. Another method is to place the animal which represents the name upon the pictograph. This is shown in the *Selkirk Treaty*, where the chiefs signed their names by drawing animals representing them, which were placed opposite the tracts of land which they claimed. The appended copy of the signatures of the contracting parties to the *Selkirk Treaty* is taken from "The Treaties of Canada with the Indians of Manitoba, the North-West Territories and Keewatin."

OF RED RIVER ON THE DAY AFORESAID

(SIGNED) SELKIRK MACHE WKEOCAB. MECHKADEWIKONAIC. KAYAYIOKIBINOA

HIS MARK HIS MARK HIS MARK

LE SONNANT

PEGOWIS HIS MARK

OUCKIDOAT HIS MARK

PREMIER

SIGNED IN PRESENCE OF

THOMAS THOMAS

JAMES BIRD

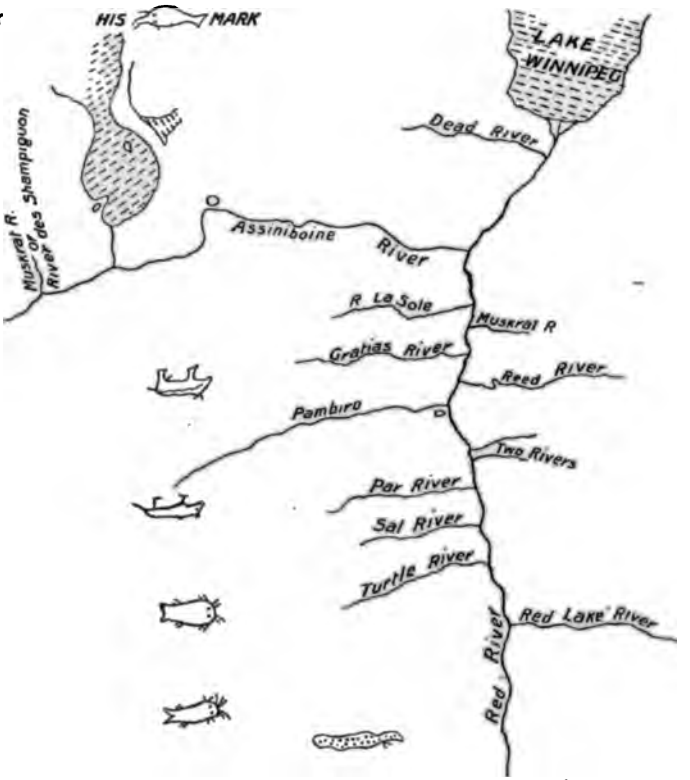
F. MATTHEY CAP.

P. D-ORSOMEOOS CAPT

MILES MACDONELL

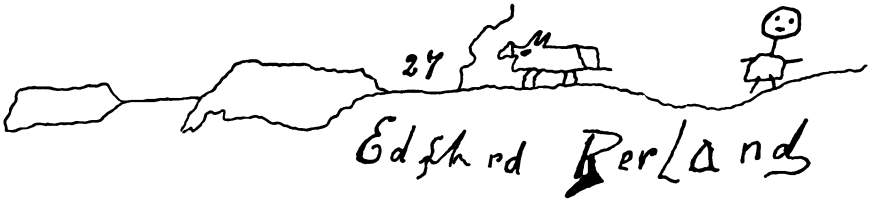
J. B^T CH^T DE LORIMER

LOUIS NOLIN I^TR.



THE SIGNATURES OF THE CONTRACTING PARTIES TO THE SELKIRK.

Rock-carvings and etchings on bone and shell are found, illustrating the modes of picture-writing. As in the Indian chant there is the repetition of a single idea, so in the native pictography there is an expression of a single thought represented by a pictograph. The headless body of an Indian with a gun or spear beside him represents death, and the means by which he was slain. The following pictograph was found by Sir George Simpson upon a tree as he was travelling in the West:



This was inscribed with a piece of burnt wood, and was nothing less than a letter for the information of the party. The contents of this pictograph were, that Edward Berland was awaiting the party with a band of twenty-seven horses at the point where the river received a tributary before expanding into two consecutive lakes. In a pictograph describing a battle, an Indian with an empty hand and fingers extended meant that he had no weapons with which to fight.

The native tribes used this system of writing extensively for the purpose of ornament, expression of religious ideas, recording of notable events, which may be the history of the tribe for half a century as in the Dakota Count, some single event in the life of a single individual, or a war party, or the autobiography of a man. Map-making by the Eskimo and Indians was accurately done on birch bark and other substances.

An Indian can describe upon the ground with a piece of wood, as I have seen them do, the geographical features of the country and various routes.

Concerning the Ojibway pictography, Schoolcraft says:—"For their pictographic devices the North American Indians have two terms, namely, *Kekeewin*, or such things as are generally understood by the tribe, and *Kekeenowin*, or teachings of the *medas*, or priests, and *jassakeeds* or prophets. The knowledge of the latter is chiefly confined to persons who are versed in their system of magic medicine or their religion, and may be deemed hieratic. The former consists of the common figurative signs, such as are employed at places of sepulture, or by hunting or travelling parties. It is also employed in the *mussinabiks*, or rock-writings. Many of the figures are common to both, and are seen in the drawings generally: but it is to be understood that this

results from the figure-alphabet being precisely the same in both, while the devices of the nugamoons, or medicine, wabino, hunting and war songs are known solely to the initiates who have learned them, and who always pay high to the native professors for this knowledge." The mythology of the Indians was sometimes represented by pictographs. When Marquette and his companions went down the Mississippi a pictograph was seen which filled the Indians with awe, and they told him that this rock-inscription represented a story, which was "that a demon haunted the river at this place, whose roar could be heard at a great distance, and who would engulf them in the abyss where he dwelt; that the waters were full of frightful monsters who would devour them in their canoe." Rock inscriptions are abundant in the localities frequented by the Indians scattered over the northern part of the continent. Many of them, however, are in secluded places, and not easily discovered by travellers.

Birch-bark rolls are used by the Cree Indians, one of which, belonging to Louis Constant, is neatly illustrated in "The Rainbow of the North," with this explanation:—"Some time since he put into Mr. Hunter's hands the last relic of his former superstition. It is a roll of birch-rind, about four feet long and nearly a foot broad, and on the inner surface are scratched with some pointed instrument various hierographic devices, intended to mark out the straight road to long life and happiness. This road is guarded on one side by figures of the sacred goose, and on the other by a corresponding row of the heads and arms of some of their other deities, while the supposed paths of the wicked diverge from the main road and are lost. But the whole is so uncouth that it is only worthy of attention as a proof of the extravagances into which the human mind is suffered to fall when it has departed from the living God. And yet it cannot rest satisfied without a guide, real or self-created. Louis Constant told Mr. Hunter that he used to regard this roll with the same reverence he now felt for the Bible, but that, as might be expected, it had since his conversion been to him a source of shame and sorrow." In various places in the Dominion pictographs have been discovered. Schoolcraft describes an elaborate inscription on the rocks on Cunningham's Island, ascribed to the Eries, a tribe now extinct. Some have been found in the country of the Micmacs in the eastern part of the Dominion. About twenty miles from Port Arthur and three and a half miles from Rabbit Mountain Mine, lying between it and Lake Superior, is a small lake opening out of Lake Oliver. Upon the rocky walls of one of the shores of this small lake are coloured pictures of men, canoes, paddles, crabs, serpents and other figures. There is the "Jesuits' Cross" on a rock on the northern shore of Lake Superior, between

Silver Islet and Nepigon, and upon the Nepigon River are pictographs so accurately drawn that Indians from the far north have been known to interpret their meaning. Upon the Missouri river near Cow Island, and about thirty miles south of Benton, there are figures of lodges, men fighting and similar pictures upon the face of the high cliffs, and so great is their elevation that the Indians say they are the works of the spirits. When the South Piegan Indians visited these rocks, they used them as models when they returned home, drawing figures on robes similar to those they had seen. Henry Shoecat, an intelligent young Indian who was acting as interpreter for the Mounted Police, informed me during my residence among the Blood Indians that there are some pictured rocks which he had seen between Helena and Sun River, in Montana, and others on the south side of Chief Mountain. Indians and white men have told me repeatedly of the wonderful *writing stones* on the Milk River, about forty miles from Lethbridge, and near the West Butte, where the Mounted Police have a post. These stones are covered with figures, some of which the Indians say were written by the spirits, but the better interpretation given by many of the Indians is that war-parties of the Bloods and Piegans passing to and fro were in the habit of writing upon these rocks, stating the number of men and horses there were in the camps of their enemies. This is the opinion of Jerry Potts, the Piegan chief and Mounted Police guide and interpreter. When Henry Shoecat was acting as interpreter at the police post near the *writing stones*, the men stationed there were in the habit of writing upon these stones, thus mingling the figures made by white men with the native pictography. Not far distant from the *writing stones*, and on Milk River, are several caves which have been visited by Jerry Potts and others, in which there are stone couches and drawings upon the walls.

The Blackfoot system of pictography was used by the Indians on the outside of their lodges. Figures were painted in different colours which were a record of the exploits of the master of the lodge. The scalp-locks were fastened above the picture-writing, the latter passing around, the figures generally enclosed between two lines, running evenly around the lodge leaving a space from two to three feet wide for the pictographs. The lodges of Medicine Calf, Red Crow and Bull Shield were especially noticeable in the early years. Some of the Indians could draw pictures of animals upon paper very well. Hunting and war scenes on paper or leather were also well executed.

One of my Blood Indian young men drew for me upon two sheets of foolscap, two specimens of the native pictography, which are here shown (Plates I., II.).

A short time ago I procured for a friend in England the hide of a steer having the autobiography of one of the Blackfeet upon it. This is the *Life of Many Shots*, which is here produced with the translation of this native autobiography.

LIFE OF MANY SHOTS.

1. There are two lodges and two carts at the place where Many Shots with a large party of warriors, who are following the foot-marks of their horses which have been stolen. They overtake their enemies, and Many Shots kills the last man. In front of the man at *A*, holding his gun in the act of shooting, will be seen small dots which represent the bullets flying. From the lodges at *B* following down by *A* will be seen small strokes—which can be distinguished from the footprints of the horses; these represent the number of journeys undertaken by *Many Shots*.

2. The wife of Many Shots has been out riding and has caught sight of an antelope, which she kills with an axe. She continues her journey and with the same weapon kills a bear.

3. There are six lodges of the Cree Indians, which do not mean actually that number, but a large camp. The Blackfeet steal the horses of the Crees, who follow them to recover their horses.

4. The Blackfeet make a rifle-pit where they come to a stand and fight. Within the pit they have a medicine-man with them, who can be distinguished by the medicine-pipe which he is smoking. The guns around the pit signify that there is a great number of Indians. In the fight there are three Crees and one Blackfoot killed. These are seen lying inside the rifle-pit.

5. There are four lodges. The Cree Indians stole the horses of the Blackfeet, who went in pursuit of them.

6. As they journeyed the Blackfeet killed an antelope. Many Shots met an Indian and stabbed him.

7. The Blackfeet still followed the Crees, and came to a place where five Indians had killed a buffalo.

8. They overtook the five Indians and killed one with an axe, four of the Cree Indians escaping.

9. A large circle of lodges, in which there was a great battle.

10. Beside this circle of lodges is a buffalo-pound, having two walls made upon the prairie, marking the path by which the buffalo were driven into the pound. Within the pound are two buffalo, and on the outside are Indians shooting at them. This is to show the method Many Shots used in killing buffalo.

11. This circle represents a lake, and within the circle is an elk, which is Many Shots' method and is according to the Blackfoot custom of naming it. The lake is called Elk Lake.

12. Three Sioux Indians are seen confronting Many Shots, who is on horseback. They shot and killed the man in front of the horse. The two remaining companions of Many Shots ran away, represented by the two men on foot running away from the horse. Many Shots fired at the Sioux Indians and killed the one farthest from him, as is shown by the man holding up his gun, and the blood flowing from under his arm.

13. Many Shots came upon two Indians fighting. He fired and broke the leg of one of the men, as can be seen from the blood flowing from his leg. Under this man's arm can be seen a bow and arrow which he took from the man. After he broke the leg of his enemy he ran towards him and killed him. Behind the horse of Many Shots can be seen a bow and seven guns, which represent the number which he took in the battles in which he was engaged.

14. The thirteen strokes in the middle of the robe represent the thirteen battles in which Many Shots was engaged during his life.

This is the history of the events of the life of Many Shots, as painted by himself in various colours upon a hide neatly tanned, in my possession, and the style of pictography fitly illustrates the system in use among the Blackfeet. Many Shots is the hero of every adventure, and the whole constitutes a native book on leather worthy of preservation.

RAINFALL AND LAKE LEVELS.

By R. F. Stupart, Director of the Observatory, Toronto.

[*Read 22nd February, 1896.*]

During the past few months the rainfall observations taken at Canadian Meteorological stations up to the end of 1895 have been collected and collated for the purpose of publication. It occurred to me to try and discover how a varying annual rainfall affected lake levels, and whether there are any good grounds for belief that the levels are becoming permanently lower either owing to a diminished rainfall or from other causes.

Prior to 1872 there were but few rainfall stations in the Dominion. In that year, however, when the Meteorological Service was inaugurated, regular observations were begun at many stations, and at some of them a continuous record has been kept up to the present time, but at most voluntary stations observations are more or less desultory.

The lake level curves up to 1888 have been taken from Mr. Charles Crossman's chart, and the curves for subsequent years filled in from information supplied by Mr. E. S. Wheeler, Assistant U. S. Government Engineer, of Sault Ste. Marie, and by the Harbour Master of Toronto.

From my knowledge of the irregularities of rainfall distribution, I conceived that for a comparison of lake levels and rainfall curves the latter should be formed from means obtained from observations made at as large a number of stations as possible, and have therefore used all stations in the Lake Region, both American and Canadian, which go back as far as 1874.

For the watershed of Lake Superior we have three stations, Port Arthur, Duluth and Marquette; for Michigan and Huron, Beatrice, Orillia, Presqu' Isle, Point Clark, Goderich, Parry Sound, Southampton, Gravenhurst, Barrie, Alpena, Grand Haven, Chicago, Milwaukee, Escanaba, and Lansing.

For Lake Erie, Woodstock, Port Stanley, Port Dover, Detroit, Cleveland, Toledo; and for Lake Ontario, Toronto, Kingston, Buffalo, Rochester and Oswego.

Taking the pentad means at 30 stations scattered over the lake region we find very little ground for belief that the annual rainfall has

within the last quarter of a century been appreciably affected by deforestation and drainage. These five year periods shew total precipitation in inches as follows: 31.1, 36.6, 35.1, 32.5, and 32.1, a series from which it would be rash to predict that the mean of the next period will not be as great as of any of those preceding it. Taking the pentad means for Toronto alone we have ten such means, and the sum of the first five exceeds the sum of the last five, in fact the mean for the 1876-80 is the only one in the last set that is as great as the smallest mean among the first five. This looks suspicious, but we can throw additional light on this subject, as we have in "Rainfall and Snow of the United States," published by the Weather Bureau, a record of the total rain and snowfall at several places in New York and Ohio for longer periods than at Toronto. At Marietta, Ohio, the record goes back to 1818; at Albany, N.Y., and at Troy, N.Y., to 1826; at Rochester, to 1834; Steubenville, Ohio, to 1835. Marietta, Steubenville, and Rochester will probably best indicate the rainfall of the Lake Ontario drainage area since as a general thing the same storm centres which cause rain in Ohio, cause it over the Ontario district, while Albany and Troy are ofttimes affected by storm centres moving up the Atlantic coast. A study of these records (see table) shews pretty clearly that immediately south of Ontario and Erie, between 1834 and 1846, occurred a period of comparatively small precipitation, in fact to the present date we shall find no other period of 12 years with such a small rainfall; then immediately following this we find a period of much heavier rain. To my mind the figures in the table afford fairly strong evidence that the rainfall has not been appreciably affected by deforestation, and that a deficiency of rainfall may be considered as only temporary.

	Pentad Means, 1818-22.	Pentad Means, 1826-30.	Pentad Means, 1831-35.	Pentad Means, 1836-40.	Pentad Means, 1841-45.	Pentad Means, 1846-50.	Pentad Means, 1851-55.	Pentad Means, 1856-60.	Pentad Means, 1861-65.	Pentad Means, 1866-70.	Pentad Means, 1871-75.	Pentad Means, 1876-80.	Pentad Means, 1881-85.	Pentad Means, 1886-90.	Pentad Means, 1891-95.
Marietta, Ohio	42.6	41.8	43.9	37.6	39.4	47.4	40.6	44.8	43.2			38.1	39.7	47.0	
Troy, N.Y.		39.2	35.2	29.1	29.1	37.3	34.7	37.0	39.3	40.2	39.2	38.0			
Albany, N.Y.		40.2	39.8	42.1	41.3	43.6	37.8	35.8	36.3	42.9		39.0	36.6	40.6	35.3
Rochester, N.Y.				28.9	31.2	35.3	31.2	34.5	36.1	37.6	37.6	39.2	30.7	32.7	34.8
Steubenville, Ohio			9.2	33.7	38.2	50.8	38.2	46.8	43.4						
Toronto, Ont						34.8	35.0	33.8	34.2	37.9	28.7	34.2	29.5	31.1	31.7
Buffalo, N.Y									37.9	39.9	33.6	40.8	39.5	39.4	38.5
Oswego									48.1	40.4	31.2	40.6	34.9	34.5	34.4
Lake Ontario Water Shed											32.2	38.1	33.9	34.6	33.7
Lake Erie Water Shed											32.9	37.2	35.1	33.5	31.6
Lake Huron Water Shed											31.3	36.8	36.6	32.3	33.3
Lake Region as a whole											31.1	36.6	35.1	32.5	32.1

A fact that should now be noted is that years of heavy precipitation in the Lake Ontario region are not usually years of heavy precipitation over the Upper Lakes and *vice versa*. To be convinced of this we have only to inspect the following table, which shews the departures from the average of twenty-five years in the various drainage areas, as obtained from the yearly means at the stations before mentioned:

YEAR.	1878	1879	1880	1881	1882	1883	1884	1885	1886	1887	1888	1889	1890	1891	1892	1893	1894	1895
Lake Superior	+" 0.3	+" 8.5	+" 4.4	+" 6.4	+" 2.9	−" 3.9	+" 4.9	−" 7.0	−" 0.7	−" 2.8	+" 0.4	−" 0.4	−" 3.0	−" 1.4	−" 4.3	−" 1.7	+" 0.6	−" 3.3
Lake Huron	+ 4.4	− 0.7	+ 4.7	+ 0.4	− 0.5	+ 6.0	+ 2.1	+ 1.6	0.0	− 3.7	− 5.1	− 2.5	− 0.8	− 1.6	+ 1.6	+ 1.4	− 4.5	− 3.7
Lake Erie	+ 8.8	+ 0.9	+ 3.2	+ 3.7	+ 0.2	+ 4.2	− 2.6	+ 0.1	− 0.6	− 2.1	− 2.9	− 3.8	+ 6.8	− 1.1	+ 1.8	− 0.5	− 6.2	− 6.2
Lake Ontario	+ 17.9	− 1.1	+ 3.9	− 1.2	− 4.3	+ 0.8	− 1.5	+ 3.3	+ 4.3	− 7.7	− 3.8	+ 2.0	+ 5.9	− 3.0	+ 1.5	+ 2.5	− 0.6	− 4.7

It will be observed in comparing the Ontario and Superior departures from average, that not only do the departures from average not agree as to percentage above or below normal, but in 13 out of 18 years they differ as to sign; years with an excess of precipitation in one district being years of deficiency in the other. A comparison of Lake Ontario with Lake Huron shews a less marked difference, but even there it is very pronounced.

There being then such strong evidence that years of small precipitation in the Ontario region are usually years of heavy precipitation over the Upper Lakes, we may surmise that from 1834-46 was on the whole a rainy period in the Upper Lake region.

A glance at the lake level curves shews that obviously the seasonal fluctuations are mainly attributable to the melting of the snow in the spring, and to precipitation; while streams are all full and evaporation is not very great the lakes rise very rapidly, and then after midsummer, or in the case of Lake Superior after the end of August, fall steadily until the melting of the snow in the following spring.

The average annual range in feet of Lake Superior is 1.2, Lake Huron 1.3, Lake Erie 1.6, and Ontario 1.8.

The curves shewing variation in annual rainfall, and the mean lake levels, except that of Superior, are strikingly similar in form for the greater portion of the period for which we have sufficient data, but marked disagreements in some few years, and certain other features shewn graphically on the charts indicate very clearly that, although the level of each lake responds to an increased or diminished rainfall, there are other factors to be considered.

The two principal factors governing the level of the water in any one of the various lakes are the precipitation over its own drainage area and the stage of the water in the lake above it. Other factors are evaporation, wind, etc.; but these we must at present regard as fairly constant, as a consideration of them would entail an immense amount of work. I had thought before charting the curves for Lake Superior that the mean rainfall as deduced from the observations at the three stations before named would give a very fair approximation to the precipitation over the water-shed of that lake, and Lake Superior being the head of the chain, and the rivers and streams emptying into it being for the most part small, I should at once find a very clear and undoubted similarity between the annual lake level and rainfall curves, but I was disappointed. The mean annual level does not seem to respond in by any means a satisfactory manner to the changes in the mean annual rainfall, as deduced from the three stations before named; and the most probable explanation of the discordance is that the rainfall curve is not based on sufficient data, and does not shew the true state of affairs. The greater part of the drainage area of Lake Superior lies to the north, a region where until but a few years ago no observations of the rainfall were taken For eight years, however, a regular record has been kept at White River, at which station during 1893-4-5 the rainfall was much in excess of the average of the eight years, and would form a curve well in accord with the lake levels, whereas the rainfall over the western portion of the lake was below average. It is then obvious that we are not at present in a position to draw a curve shewing with a sufficient degree of accuracy the rainfall over the water-shed of Lake Superior.

We will now briefly consider the state of affairs in the region of the great lakes since 1870, assuming as a fact that the level of that lake is altogether governed by rainfall over its own drainage area. In 1870 the levels of Superior and Huron were medium, but during the autumn an abnormal fall of the former began. The summer stage of Ontario in this year was very high, clearly owing to one of the largest rainfalls on record occurring over its drainage area. The two following years were low water years on Lake Superior, and Lake Huron felt the effect of it, and with a rainfall of 3.1 inches below average in 1871, and 4.0 below in 1872, the water level was in the latter year fairly low. The diminished head of water in the higher lakes, and a precipitation several inches less than average, brought a rapid lowering of Ontario, and 1872 was a year of decidedly low water. During 1873 Lake Superior was a trifle above mean level, and this fairly good level seems to have outweighed an under average rainfall in the Lake Huron area, as that lake although still low was slowly rising. Ontario rose very considerably in this year, notwithstanding the low water in the

Upper Lakes, the rise being clearly attributable to unusually heavy precipitation. In 1874 Superior was a little higher, but a pronounced deficiency of rainfall over the Lake Huron area caused that lake to remain nearly stationary, notwithstanding the good inflow from Lake Superior; and the effect of the comparatively low water in Huron, combined with a small precipitation over the drainage area of Ontario, is clearly marked by the decided decrease in the level of Ontario. In 1875 Superior was still fairly high, and as the rainfall over the Huron area was well up to average, that lake rose, but was still below mean level, and Ontario, with a deficiency of rainfall, was also low. In 1876 the Ontario level shewed the marked influence of high water in the Upper Lakes. Superior was high, and this fact with a large precipitation over the Lake Huron drainage area caused a marked rise and high water on that lake also, and to this must be attributed the high water in Ontario as over its drainage area the precipitation was only average. Now followed four years of low water on Lake Superior which counteracted the effect of an above average precipitation over Lake Huron, which lake fell steadily in 1877 and 1878, and was low in 1879 and 1880. On Lake Ontario while the level fell in 1877 with a small rainfall, in 1878 very heavy rains in the autumn produced an altogether abnormally high winter stage, but in 1879 the level fell to decidedly low, and in 1880 even a rainfall of four inches above average was unable to counteract the effect of the low water in the Upper Lakes. Six years now follow with Superior either average or a little below average level and on Lake Huron a level steadily increasing from the mean level to high water, clearly due to the precipitation being much above average. The curve for Ontario during this period was somewhat similar to Huron, the level of the lake increasing from a low to a decidedly high stage, and this during the first four years, notwithstanding a deficiency of precipitation over the drainage area. Taking the last period, from 1887 to date, we find that Superior during the first two years was a little low, with a tendency to increase, then a very slowly lowering stage until the spring of 1892, when the level was lower than at any time since 1880. Next spring it reached the same mark, and then a rise began, and in September 1895 the level was higher than at any time since 1878. There was then low water in Lake Superior from 1887 to 1894, and this helped to lower Lake Huron, and the rainfall over the Lake Huron drainage area was for the five consecutive years, 1887-1891, and again in 1894 and 1895, much below average. We can now see why Lake Huron is so decidedly low—it is due to Lake Superior having been low for some years until 1894, combined with the effect of an abnormal deficiency of rainfall from 1887 until 1895, excepting the years 1892

and 1893. At the beginning of this same period in 1887 Lake Ontario was high, but two years of exceedingly small rainfall rapidly lowered the level. In 1889 and 1890 the rainfall was above average and temporarily checked the fall which would have resulted from the low water in the Upper Lakes, but in 1891 a marked deficiency of precipitation brought a very low winter stage. Two years, 1892 and 1893, of above average rainfall now improved the level a little, but the deficiency of rainfall in 1894 and 1895, and particularly in the latter year, in conjunction with the effect of a small intake of water by the Niagara River, doubtless produced the almost phenomenally low stage of the past year. I believe that these facts are amply sufficient to explain the present state of affairs.

I. was at first rather nonplussed to account for the fact that the highest water on record, in 1838, occurred during a period which the Ohio and New York records which I have quoted, indicate as a dry period, but I now think that it is probably quite unnecessary to be disconcerted by this, as our table giving departures from average rainfall during the various years in the several drainage areas, shews so conclusively that when the Ontario district has an under average rainfall the Upper Lakes usually have an excess. We have a very significant instance of the effect of such conditions, when between 1881 and 1884 Ontario rose from low water to a decidedly high stage, notwithstanding a marked deficiency of rainfall during the four years. Somewhat similar conditions prior to 1838 may well have produced the very high stage of that year.

Meteorologists have so far been unable to prove that terms of excessive rainfall or the contrary are periodical. It is not, however, improbable that there are several physical influences which periodically affect the precipitation, and it may be that in some periods these influences work in unison to increase it while at other times they interfere, and should this supposition be correct, we can easily understand that we are dealing with a very complicated subject, and that observations during a long period of years will be necessary to unravel the mystery.

In view of these facts it is quite unreasonable to suppose that Lake Ontario will this year or even next year attain a high stage, the increase is likely to be gradual. Lake Superior is, as we have seen already, high; this will help to raise the level of Huron, which lake will rise if the rainfall be even up to average, and then with an improving head of water in that lake, and consequently in Erie, the flow by the Niagara will improve and assist in raising the level of Ontario, but with so many factors to be considered it is impossible to predict with any certainty how long it will be before a really high stage is again reached.

THE BLACKFOOT LANGUAGE.

BY REV. JOHN MACLEAN, M.A., PH.D.

[*Read 11th April, 1896.*]

The Blackfoot Language is spoken by the Indians belonging to the Blackfoot Confederacy, consisting of the tribes known as Bloods, Piegans and Blackfeet. These tribes are resident in Montana, United States, and Alberta, Canada. They possess no written characters, and consequently have not any native literature. Their knowledge of important events is transmitted by means of oral tradition, and their records of deeds are expressed by picture-writing.

The language is a rich deep guttural, difficult at first to be pronounced or understood, owing to the rapid utterances of the Indians. Students of Indian languages are very apt to make mistakes in the early stages of their studies, from the fact that many of the Indians conversing with them use "broken speech." At once they conclude that the language is very easily acquired, but if they will continue their studies faithfully they will soon learn that they have a hard task before them, which can only be mastered by intelligent and enthusiastic labour. Some time will elapse before the sounds peculiar to the language become familiar to the ear, but gradually these will separate themselves and become easily distinguished.

One striking peculiarity is the dropping of the first and last syllables of words. Familiarity with the language will enable the student to detect this whenever it is done. Take such an example as *nĭtukskûm*, which means *one*. Sometimes it is expressed in full, but I have oftentimes heard it as follows: nĭtuks, nĭtukska, tukskûm and tukska. The prevalence of the guttural induces this dropping of syllables. The first and last syllables are at times expressed in such a low tone that they become inaudible to our ears.

The Blackfoot, like many other Indian languages, possesses the property of agglutination, and hence assumes the verbal form of expression. Indian languages are languages of verbs, and the Blackfoot is no exception to the general rule. He who would master an Indian language must give his days and nights to the study of the verb.

Dialectic changes are rapidly taking place amongst the tribes, resulting from separation. Differences of pronunciation and different words

"coined" for things unknown to them when they lived together as the netsepoye, *i.e.*, the people that speak the same language, are the results of the advent of the white race and their superior civilization.

ORTHOGRAPHY.

A standard system of orthography is a necessity in reducing any language to writing. Students of Indian languages not being guided by a standard system, generally adopt a phonetic method of spelling, which varies with the mental training or acute perception of the individual. A "key" to the individual systems must then accompany every book written in the language for the use of others, and oftentimes this is very difficult of application in studying the language. Having used a system of my own for several years, I was ultimately induced to abandon it after an examination of the universal alphabet of the Bureau of Ethnology, Washington, United States. This was in my opinion preferable to the Standard Alphabet of Lepsius, and I therefore selected the letters with their combinations which were suitable for expressing the sounds of the Blackfoot Language. Instead of arranging this standard system in different sections, treating of vowels, consonants, diphthongs and double letters, the whole has been placed consecutively, thus becoming a "key" which can be easily memorized and is ready for reference.

THE ALPHABET.

a as in far, father : as sĭnaksĭn = a book or letter.
â as in law, all : as napĭkwân = a white man.
ai as in aisle, and as *i* in pine : as kûnaitûpĭ = all the people.
au as *ou* in out and *ow* in how : as mamyauyekwân = a fish eater.
e as in they, like *a* in fate : as asetûqta = a small stream.
ĕ as in then, met : as nĭtonoetsĭ = I am hungry.
h as in ha, he : as hau ! hau = a form of salutation.
i as in pique, machine : as imĭta = a dog.
ĭ as in pick, pin : as kĭpĭtakĭ = an old woman.
k as in kick : as kaksakĭn = an axe.
m as in man, money : as manikûpĭ = a young man.
n as in nun, now : as notas = my horse.
o as in note : as oqké = water.
p as in pipe : as ponokamĭta = a horse.
q as *ch* in loch—*guttural :* as oqkotokĭ = a stone.
s as in sauce : as sokasĭm = an outer garment or coat.
t as in touch : neetûqta = a river.
u as in rule, full : puqsĭput = come thou here.

û as in but, hut: matûpĭ = a person.
w as in wish: awanĭo = he says.
ks as *x* in wax, and *ks* in books: as akeks = women.
maksĭnûm = cross.
y as in you: as moyĭs = a lodge.
tc as *ch* in church, and *tch* in match: as tcanĭstapĭ = what is it.
matcapsĭo = he is foolish.
kw as *q* in quick, quart: as akekwân = a girl.
kainakwân = a Blood Indian.

The following sounds, as expressed by their respective letters in the English language, have no equivalent in Blackfoot, namely: b, d, f, g, j, l, v, z.

The sounds belonging to the alphabet *never change*, so that when once understood and memorized one great difficulty is overcome. There are no silent letters, every vowel and consonant having its own appropriate sound. When two or more vowels come together they must be pronounced separately, unless forming diphthongs in accordance with the alphabet. I have thought it best to dispense with the use of the hyphen in connecting syllables, as a little more care bestowed upon the grammatical construction of the language will enable anyone to distinguish the syllables, and thus be saved the trouble arising from the transition to connected reading.

ACCENTUATION.

Many of the difficulties of pronunciation can only be grasped by a practical acquaintance with the language. The interpretations of some words are changed by the change of accent, and also by a more emphatic pronunciation of the word in full. The *acute* accent is used to point out the syllable or vowel upon which the stress is to be laid, as: nĭtsémanĭ = I am speaking the truth, oqké = water.

Excessive prolongation of a vowel changes the sense of the word. This strong emphasis or prolongation is designated by a × placed under the emphatic letter, as a, o.
× ×

Oma = there. Oma = yonder.
×
Aqse = good. Ekskaqse = very good.
Ekskaqse = very, very good.
×

There is a half vowel sound which is denoted by a comma below the vowel, as: kĭa = come on, or, let us go.

EUPHONY.

In the combination of letters and the formation of words, strict attention is paid to the agreeableness of sound. This is one of the peculiar characteristics of the language. In the formation of compound words, when two syllables come together, which in combination will produce a harsh sound, one of the syllables is elided, as: omûqkĭmĭ = big, nina = a chief. When combined, the *mĭ* of the simple adjective is rejected and it becomes omûqkĭnina = a big chief. Niokskûm = three, otasĭks = horses (his), niokskotasĭks = three horses.

When two simple words in combination possess several harsh-sounding consonants, two or more of the syllables are elided, as: siksĭnûm = black, oqkotokĭ = stone, sikoqkotokĭ = black stone, *i.e.*, coal. When two or more vowels come together in word-forming, and the sound resulting from their union is not harmonious, a consonant is inserted to secure the euphony. This is particularly noticeable in the verb, with its article, pronoun or pronominal prefix, as: nĭstoa = I, awan = root of verb, ĭ = verbal termination. When combined we have: nĭ–t–awan–ĭ = I say, kĭ–t–awan–ĭ = thou sayest, awan–ĭo = he says. The letter *t* is inserted to secure harmony of sound.

Sometimes a vowel is changed in combination, as: omûqkĭmĭ = big, kaio = bear. From these we have: omûqkokaio = big bear. Here the last syllable of the adjective is elided, and the last vowel remaining, namely ĭ, is changed to o. Sometimes a vowel is rejected in combination, as: ponoka = deer, imĭta = dog. Combined, we have ponokamĭta = deer-dog, *i.e.*, a horse.

All the parts of speech are found in the language except the article. The numeral adjective nĭtukskûm = one, and the demonstrative pronouns amo = this, and oma = that, are used to supply the place of the articles as, nĭtukskûm ponokamĭta = one horse, or a horse, amakio = this woman, amakekwân = this girl, or the girl, omakekwân = that girl, or the girl. They do not strictly supply the place of the articles, but they are used for that purpose.

The Blackfoot, Cree and Ojibway languages belong to the Algonkin family of languages, and in order to show the relation existing between them, there is subjoined a list of words in these three languages. The Blackfoot, Blood and Piegan tribes speak dialects of the Blackfoot, but as the changes made are slight, except in the coining of new words, it would not be expedient to spend time in tracing these differences. The lists of the three related languages are as follows:—

ENGLISH.	BLACKFOOT.	CREE.	OJIBWAY.
Man. (A human being—a person.)	Matûpĭ.	Aiyĭnĭo.	Anĭshĭnabĭ.
Man. (As distinguished from a woman.)	Ninao.	Napeo.	Ĭnĭnĭ & Anĭnĭ.
Woman.	Akio.	Ĭskweo.	Ĭkwe & Akwe.
Girl.	Akekwân.	Ĭskwesĭs.	Ĭkwĕsĕns.
Boy.	Saqkomapĭ.	Napes & Napesĭs.	Kwĭwĭsĕns.
My father.	Nina.	Notawĭ.	Nos.
His father.	Onĭ & Unĭ.	Otawĭa.	Osan.
My mother.	Niksĭsta.	Nĭkawĭ.	Nĭngû.
My son.	Noqkoa.	Nĭkosĭs.	Nĭngwĭs.
My daughter.	Nĭtûna.	Nĭtûnĭs.	Nĭndûnĭs.
My child.	Nokos.	Nowasĭs.	Nĭnĭdjanĭs.
My elder brother.	Neesa.	Nĭstes.	Nĭsaĭ.
My younger brother.	Nĭskûn.	Nĭsim.	Nĭshĭmĭ.
My elder sister.	Ninĭsta.	Nĭmĭs.	Nĭmĭsĭ.
My younger sister.	Nĭsĭsa.	Nĭsim.	Nĭshĭmĭ.
My brother-in-law. (The brother of my wife.)	Nĭstûmo.	Nĭstau.	Nĭta.
My brother-in-law. (The husband of my sister—male speaking.)	Nĭstûmoqko.	Nitĭm.	Nĭta.
My sister-in-law. (Wife of brother - male speaking.)	Ninĭsa.		Nĭnĭm.
My wife.	Nĭtoqkeman.	Niwa.	Nĭnwĭdĭgĭmagan.
My husband.	Noma.	Ninabem.	Nĭnabĭm.
My head.	Notokanĭ.	Nĭstĭkwan.	Nĭshtĭgwûn.
My foot.	Noqkûts.	Nisĭt.	Nĭsĭd.
My tooth.	Noqpekĭn.	Nipĭt.	Nĭbĭd.
My throat.	Noqkĭston.	Nĭkutakûn.	Nĭngongagan.
My brain.	Nopĭ.	Niyĭtĭp.	Nĭnĭndĭb.
Mouth.	Maáye.	Mĭton.	Mĭndon.
Tongue.	Matsĭne.	Mĭteyûnĭ.	Dĭnanĭo.
Fire.	Ĭstci.	Ĭskuteo.	Ishkotĭ.
Water.	Oqké.	Nĭpi.	Nĭbĭ.
River.	Neetûqta.	Sipi.	Sĭbĭ.
Wood.	Mĭstcĭs.	Mĭstik	Mĭtĭg.

ENGLISH.	BLACKFOOT.	CREE.	OJIBWAY.
Blood.	Apûn.	Mîko.	Mîskwî.
Lodge.	Moyîs.	Mikîwap & Apakwasûn.	Wîgîwam.
Knife.	Ĭstoan.	Mokuman.	Mokoman.
Sun.	Natos.	Pisîm.	Gîsîs.
Earth, land.	Tsaqkom.	Ûskî.	Akî.
Dog.	Imîta.	Ûtîm.	Anîmosh & Onîm.
Winter.	Stoye.	Pîpon.	Bîbon.
Bow.	Netsînamau & Namau.	Atcapî.	Mîtîgwab.
Moccasin.	Matsîkîn.	Mûskîsîn.	Makîsîn.
Stone.	Oqkotokî.	Asînî.	Asîn.
Snow.	Konîsko.	Kona.	Gon.
Ice.	Kokotoyî.	Mîskwamîî.	Mîkwam.
One.	Nîtukskûm.	Peyûk.	Bîjîg.
Two.	Natokûm.	Niso.	Nij.
Three.	Niokskûm.	Nîsto.	Nîswî.
Four.	Nîsoyîm & Niso.	Neo.	Nîwîm.
Five.	Nîsîto & Nîsîtcî.	Nîyanûm.	Nanan.
Six.	Nao.	Nîkotwasîk.	Nîngotwaswî.
Seven.	Ĭkîtcîka & Ĭkîtcîkûm.	Tepakûp & Nisoasîk.	Nîjwasî.
Eight.	Nanîsoyîm & Nanîso.	Jananeo.	Nîshwaswî.
Nine.	Piqseo.	Peyûkosteo.	Jangaswî.
Ten.	Kepî & Kepo.	Mîtat & Mîtatût.	Mîdaswî.
He eats.	Auyeo.	Mitcîsûo.	Wîsîno.
He sits.	Ĭpeo.	Ûpio.	Namadabî.
He sleeps.	Aiokao.	Nîpau.	Nîba.
He is sick.	Aioqtokosîo.	Akusîo.	Ûkosî.
He comes here.	Paiuqsapu.	Peitûtco & Astam.	Bîdjîja.
He goes away.	Aisîstûpo.	Matcîo.	Madja.
He goes in.	Paiyemae.	Pîtukeo.	Pîndîgî.
He goes out.	Súkseo.	Wayawîo.	Sagaam.
He loves him.	Ûkomimîo.	Sakîheo.	Sagîa.
He loves it.	Ukomitcîmae.	Sakîlao.	Sagîton.
It rains.	Aisotao.	Kîmiwûn.	Gîmîwan.
It snows.	Potao.	Mîspun.	Sogîpo.

THE NOUN.

In accordance with the agglutinative tendency of Indian languages, the Blackfoot language uses a verbalized form of speech and the noun occupies an inferior position. Nouns are seldom used separately. They are generally incorporated with the verb. It is needful, however, to understand the noun thoroughly, because of its relation to other parts of the language, and the changes that take place in the construction of the same. There are three classes of nouns, namely: proper, common and abstract. As examples of proper nouns we have: sotaina = rain chief, from the combination of aisotao and nina, ninastûko = chief mountain, from nina = chief and mistûkĭ = a mountain, namûqta = Bow river, *i.e.*, nama = a bow or gun, and neetûqta = a river.

The following are examples of common nouns: mamé = a fish, ĭĭnakĭkwân = a policeman, sĭnaksĭn = a book or letter, painokanats = paper, napyoyĭs = a house.

Many of the abstract nouns end in sĭn. This, however, is variable: pukasĭn = childhood, ûkomimĭsĭn = love, kimatapsĭn = poverty, aioqtokosĭn = sickness, ĭtamĭtûksĭn = happiness.

In treating of nouns there is seen to be for certain classes similar terminations which are general. There are many exceptions to this, even when relating to kindred subjects.

Names of water end in kimĭ and komĭ.

Stokimĭ	= cold water.
Ksĭstokomĭ	= warm water.
Motoyĭmûqsĭkimĭ	= water everywhere, *i.e.*, the sea.
Moyĭkimĭ	a grassy lake.
Omûksikimi	big water, *i.e.*, a lake.
Pûksĭkimĭ	a swamp.
Pistcikimi	salt water.
Apatsĭkimĭ	= a broad river.
Asiksĭkimĭ	= black water, *i.e*, tea.
Otoqkweksĭkimĭ	= yellow water.
Mauqsiksĭkimĭ	= red water.
Ksiksĭkimĭ	= white water.

Names of buildings end in oyis.

Moyĭs	= a lodge.
Nĭtapoyĭs	a native house, an Indian house.
Napyoyĭs	= a house, a white man's house.
Matakyoyĭs	= a potato house, *i.e.*, a root house.

Ponokamĭtoyĭs = a horse's house, *i.e.*, a stable.
Oqtokosapyoyĭs = a sick house, *i.e.*, an hospital.
Oqkotoksapyoyĭs = a stone house.
Makapyoyĭs = a dirty house.
Akapyoyĭs = many houses, *i.e.*, a village or town.
Natoapyoyĭs = a holy or divine house, *i.e.*, a church.
Omûqkûtoapyoyĭs = a large holy house, *i.e.*, a cathedral or large church.

Names of cloth end in aipĭstcĭ.

Naipĭstcĭ = a blanket, cloth.
Maukaipĭstcĭ = red cloth.
Otskaipĭstcĭ = blue cloth.
Ĭstoqkaipĭstcĭ = cotton.
Ĭnûkaipĭstcĭ = a small blanket.
Sĭkaipĭstcĭ = black cloth.
Apaipĭstcĭ = white cloth.
Otoqkaipĭstcĭ = yellow cloth.
Omûqkaipĭstcĭ = a large blanket.

Names of earth end in koyĭ.

Tsaqkoyĭ = earth, land.
Aikimĭkoyĭ = table land.
Spûtsĭkoyĭ = sand hills (spûtsĭko = sand).
Pĭkĭskoyĭ = range of hills.
Kawûqkoyĭ = ravines.
Pawûqkoyĭ = ravines.
Moqsokoyĭ = a road (moqsoko = a footprint).
Sĭkakoyĭ = black soil.
Otoqkoyĭ = yellow soil.
Atsoaskoyĭ = woodland, forest, bush.
Pûqtokskoyĭ = pine timber land, pine forest.

FORMATION OF NOUNS.

Diminutive Nouns are formed by adding as a prefix ĭnûk, ĭnûks, ĭnûksa, ĭnûksĭ.

Akekwân = a girl.
Puka = a child.
Matakĭ = a potato.
Kûkûtos = a star.
Napekwân = a white man.
Saqkomapĭ = a boy.
Ĭnûkakekwân = a little girl.
Ĭnûksĭpuka = a little child.
Ĭnûkatakĭ = a small potato.
Ĭnûkûkûtos = a small star.
Ĭnûksapekwân = a small white man.
Ĭnûkasaqkomapĭ = a small boy.

Personal Abstract Nouns are formed from verbs by adding apĭ or ûpĭ, the termination of matûpĭ, *i.e.*, a person, as:

Matcapsio	= he is foolish.	Matcapsetûpĭ	= a foolish one.
Kimatapsio	= he is poor.	Kimatapsetûpĭ	= a poor one.
Skunatapsio	= he is strong.	Skunatapsetûpĭ	= a strong one.
Mokûkĭo	= he is wise, careful.	Mokûkiatûpĭ	= a wise person.

Nouns are formed from Verbs by

1. Adding *sin* to the root of the verb, as: aisĭnakeo = he writes. Sĭnak is the root of the verb, and by adding *sin* as a suffix we have: sĭnaksĭn = a writing, letter; spiksĭnaksĭn = a thick writing, *i.e.*, a book. Sĭnaksĭn is now used by the Indians for a letter, newspaper, book or document of any kind. Aisanakĭ = a clerk, amanuensis.

2. Adding *oksĭn* as a suffix to the root of the verb as: akomimio = he loves. Omim is the root of the verb. Akomimoksĭn = love.

3. Rejecting the verbal termination of the third person singular of the imperfect tense, and adding *sin* as a suffix.

Aitametûkeo = he is glad, happy. Etametûkeo = he was happy.

Etametûksĭn = happiness.

4. Rejecting the verbal termination of the third singular present indicative and adding *in* as a suffix, as: aqseo = he is good; aqsĭn = goodness.

5. Adding *ûqsĭn* to the root of the verb, with the tense particle of the imperfect indicative mood, as: epoyeo = he spoke; epouqsĭn = speech.

Other examples of the formation of nouns from verbs are shown as follows:

Nĭtûsĭkĭtsikiqka	= I make shoes.
Atsekĭn	= a shoe, moccasin.
Ûstsĭkĭtsĭkiqkae	= a shoemaker.
Nĭtaiamûqkĭ	= I am sweeping.
Namûqkimatsĭs	= a broom.
Nĭtaikûqksĭstûkĭ	= I am sawing (across).
Ĭqtaikûqksĭstûkiop	= a hand saw.
Nĭtainamauqkao	= I make a gun.
Namaua	= a gun, bow.
Ĭtainamauqkapi	= a gunsmith.
Apautûkeo	= he is working.
Apotûksĭn	= work.

Aioqtokoqsĭo = he is sick.
Aioqtokoqsĭn = sickness.
Aioqtokoqsapyoyĭs = an hospital; literally, a sick house.

GENDER.

There are two genders, the animate and inanimate. As in the English language, the adjective undergoes no change when applied alternately to masculine and feminine, so there is none in the Blackfoot language. Thus, we say:

Matomaitûpĭ = the first man.	Matomakio = the first woman.
Aqsĭtûpĭ = a good man.	Aqsĭakio = a good woman.

The pronoun ostoyĭ has no distinction of sex—signifying he, she, it. There being no grammatical change resulting from the distinction of sex, two genders only are used—the animate, relating to things having life, and the inanimate, which refers to things without life. There are some inanimate things, however, that are treated as if they possessed life. Nearly all names of implements are clased as animates, as:

Kaksakĭn	= an axe.	Kaksakĭks	= axes.
Namayĕ and Namau	= a bow or gun.	Namayĭks	= bows, guns.
Apsĭnamau	= an arrow gun, *i.e.*, a bow.		
Ĭstoan	= a knife.	Ĭstoeks	= knives.
Notoan	= my knife.	Notoaks	= my knives.

Trees, plants, and various objects of vegetable nature have the termination for the animate gender, as:

Mĭstcĭs = a tree.	Mĭstceks = trees.
Pûqtokĭ = a pine tree.	Pûqtokĭks = pine trees.

Inanimate objects, which are related to the native religion of the Indians and are held as sacred, are classed as animates, as:

Natos	= the sun.	Natosĭks	= suns, also moons and months
Omûqkatos	= the great sun.		
Kûkûtos	= a star.	Kûkûtosĭks	= stars.
Kokumekesĭm	= the moon.	Kokumekesĭmĭks	= moons.
Neetûqta	= a river.	Neetûqtaks	= rivers.

Modes of denoting Sex.

There are different modes of denoting sex.

1st.—*By using different words.*

Nina	= a man.	Ake	= a woman.
Saqkomapĭ	= a boy.	Akekwân	= a girl.
Nina	= my father.	Niksĭsta	= my mother.
Noma	= my husband.	Nĭtoqkeman	= my wife.
Noqkoa	= my son.	Nĭtûna	= my daughter.

2nd.—By the use of *kwân* for the masculine and *ake* for the feminine terminations.

Napekwân	= a white man, *i.e.*, an English-speaking white man.
Napeake	= a white man's Indian wife.
Nĭtsapeake	= a white woman.
Kainakwân	= a Blood Indian man.
Kainake	= a Blood Indian woman.
Saiapekwân	= a Cree half-breed.
Saiapeake	= a Cree half-breed woman.

There are some exceptions to this rule, as: akekwân = a girl, which has a termination similar to the masculine.

3rd.—By adding *napĭm* or *stamĭk* for the masculine and *skĭm* or *skenĭo* for the feminine. This applies solely to animals.

Apotskina stamĭk	= a bull.	Ponokamĭta skĭm	= a mare.
Apotskina skĭm	= a cow.	Awatoyĭstamĭk	= a buck.
Ponokamĭta stamĭk	= a stallion.	Awatoyĭskĭm	= a doe.

NUMBER.

Number is that change in form which denotes whether or not we are speaking of one object or more.

Nouns have two numbers, singular and plural.

The *Singular* number denotes one object, as:

Moyĭs	= a lodge.	Neetûqta	= a river.
Ĭstoan	= a knife.	Imĭta	= a dog.
Ûqkioqsatsĭs	= a boat.		

The *Plural* number denotes more than one object of that for which the noun stands.

Moyĭsts	= lodges.	Oqkotokĭsts	= stones.
Sĭnaksĭsts	= letters.	Tcĭstcĭkwĭsts	= days.
Ponokamĭtaks	= horses.	Matûpĭks	= peoples.

There are several nouns which have no plural, as:

Napĭnoan	= sugar.	Ûnĭkĭs	= milk.

The *Animate Nouns* form the plural by adding *ks*, *tks* or *sks* to the singular, as:

Ponoka	= deer.	Ponokaks	= deer.
Nokos	= my child.	Nokosĭks	= my children.
Mame	= a fish.	Mameks	= fishes.

Inanimate Nouns form the plural by adding *ts* or *sts* to the singular, as:

Napyoyĭs	= a house.	Napyoyĭsts	= houses.
Matakĭ	= a potato.	Matakĭsts	= potatoes.
Oqpekĭn	= his tooth.	Oqpekĭsts	= his teeth.

In the formation of the plural, before adding the terminations, sometimes a syllable is dropped, or there is a change or elision of one or two vowels or consonants, as:

Akio	= a woman.	Akeks	= women.
Napekwân	= a white man.	Napekwĕks	= white men.
Matsĭkĭn	= a moccasin.	Matsĭkĭsts	= moccasins.

CASE.

Case is the form in which a noun is used in order to show its relation to some other word in the sentence.

There are three cases in the language, nominative, possessive and accusative. The possessive case is formed by adding as a prefix the abbreviated forms of the possessive pronoun, as:

N, nĭ, nĭt and nĭts for the first person.
K, kĭ, kĭt and kĭts for the second person.
O, ot and ots for the third person.

Amo nĭtsapyoyĭs	= this (is) my house.
Oma kotas	= that (is) thy horse.
Saqkomapĭ otsĭnaksĭn	= the boy, his book,—the boy's book.

ANIMATE NOUN IN THE POSSESSIVE CASE.

	BLACKFOOT.	CREE.	OJIBWAY.
SINGULAR.			
1. My father (or chief).	Nina.	Notawĭ.	Nos.
2. Thy father (or chief).	Kina.	Kotawĭ.	Kos.
3. His, her father (or chief).	Onĭ.	Otawĭa.	Osan.
PLURAL.			
Exclusive.			
1. Our father.	Ninan.	Notawĭnan.	Nosĭnan.
Inclusive.			
1. Our father.	Kinon.	Kotawĭnau.	Kosĭnan.
2. Your father.	Kinawa.	Kotawĭwau.	Kosĭwa.
3. Their father.	Onĭao.	Otawĭwaua.	Osĭwan.
SINGULAR.			
1. My fathers.	Ninaeks.	Notawĭûk.	Nosag.
2. Thy fathers.	Kinaeks.	Kotawĭûk.	Kosag.
3. His, her fathers.	Onĭeks.	Otawĭa.	Osan.
PLURAL.			
Exclusive.			
1. Our fathers.	Ninaneks.	Notawĭnanûk.	Nosĭnanĭg.
Inclusive.			
1. Our fathers.	Kinoneks.	Kotawĭnanûk.	Kosĭnanĭg.
2. Your fathers.	Kinawaeks.	Kotawĭwanûk.	Kosĭwag.
3. Their fathers.	Onĭaoeks.	Otawĭwaua.	Osĭwan.

Notas = my horse.

SINGULAR.	PLURAL.
My horse = Notas.	My horses = Notasĭks.
Thy " = Kotas.	Thy " = Kotasĭks.
His " = Otas.	His " = Otasĭks.
Exclusive.	*Exclusive.*
Our horse = Notasĭnan.	Our horses = Notasĭnanĭks.

Inclusive.	*Inclusive.*
Our horse = Kotasĭnon.	Our horses = Kotasĭnonĭks.
Your " = Kotasĭwao.	Your " = Kotasĭwawĭks.
Their " = Otasĭawa.	Their " = Otasĭawawĭks.

There will be noticed in the above comparative table, the two first persons plural, which for greater clearness I have designated exclusive and inclusive.

The *Exclusive Plural* embraces the *first* and *second* persons only.

The *Inclusive Plural* embraces the *first* and *third* persons only.

This peculiar construction ensures a greater degree of definiteness than is to be found amongst many of the languages of civilized races. It applies to the pronouns and the verbs, and when once intelligently grasped will ever be easily remembered.

INANIMATE NOUN IN THE POSSESSIVE CASE.

	BLACKFOOT.	CREE.	OJIBWAY.
SINGULAR.			
1. My book (or letter).	Nĭtsĭnaksĭn.	Nĭmasĭnahĭgan.	Nĭnmasĭnaĭgan.
2. Thy book.	Kĭtsĭnaksĭn.	Kĭmasĭnahĭgan.	Kĭmasĭnaĭgan.
3. His, her book.	Otsĭnaksĭn.	Omasĭnahĭgan.	Omasĭnaĭgan.
PLURAL.			
Exclusive,			
1. Our book.	Nĭtsĭnaksĭnan.	Nĭmasĭnahĭganĭnan.	Nĭnmasĭnaĭganĭnan.
Inclusive,			
1. Our book.	Kĭtsĭnaksĭnon.	Kĭmasĭnahĭganĭnau.	Kĭmasĭnaĭganĭnan.
2. Your book.	Kĭtsĭnaksĭnoawa.	Kĭmasĭnahĭganĭwau.	Kĭmasĭnaĭganĭwa.
3. Their book.	Otsĭnaksĭna.	Omasĭnahĭganĭwau.	Omasĭnaĭganĭwa.
SINGULAR.			
1. My books (or letters).	Nĭtsĭnakĭsts.	Nĭmasĭnahĭgana.	Nĭnmasĭnaĭganan.
2. Thy books.	Kĭtsĭnaksĭsts.	Kĭmasĭnahĭgana.	Kĭmasĭnaĭganan.
3. His, her books.	Otsĭnaksĭsts.	Omasĭnahĭgana.	Omasĭnaĭganan.
PLURAL.			
Exclusive,			
1. Our books.	Nĭtsĭnaksĭnanĭsts.	Nĭmasĭnahĭganĭnana.	Nĭmasĭnaĭganĭnanĭn.
1. *Inclusive,*			
Our books.	Kĭtsĭnaksĭnonĭsts.	Kĭmasĭnahĭganĭnaua.	Kĭmasĭnaĭganĭnanĭnĭ.
2. Your books.	Kĭtsĭnaksĭnoawasts.	Kĭmasĭnahĭganĭwaua.	Kĭmasĭnaĭganĭwan.
3. Their books.	Otsĭnaksĭnoawasts.	Omasĭnahĭganĭwaua.	Omasĭnaĭganĭwan.

Napyoyĭs = a house.

SINGULAR.		PLURAL.	
My house	= Nĭtsapyoyĭs.	My houses	= Nĭtsapyoyĭsts.
Thy "	= Kĭtsapyoyĭs.	Thy "	= Kĭtsapyoyĭsts.
His "	= Otsapyoyĭs.	His "	= Otsapyoyĭsts.
	Exclusive.		*Exclusive.*
Our house	= Nĭtsapyoyĭsĭnan.	Our houses	= Nĭtsapyoyĭsĭnanĭsts.
	Inclusive.		*Inclusive.*
Our house	= Kĭtsapyoyĭsĭnon.	Our houses	= Kĭtsapyoyĭsĭnonĭsts.
Your "	= Kĭtsapyoyĭsoawa.	Your "	= Kĭtsapyoyĭsowawĭsts.
Their "	= Otsapyoyĭsoawa.	Their "	= Otsapyoyĭsoawawĭsts.

EXAMPLES OF THE POSSESSIVE CASE.

Animate:—

Nĭskûn = My younger brother.

Néesa = My elder brother.

Nĭtûna = My daughter.

Amoksĭ mokosĭks = These are my children.

Akekwân oksĭsta etûpoyeo onĭ = The girl's mother went to her father.

Aqsĭtûpĭ otûna aioqtokoqseo = The good man's daughter is sick.

Nĭtoqkeman nĭtûkomimao = I love my wife.

Otas ĭqkonoyeo = He found his horse.

Aisûkûkomeo okosĭks = He is kind to his children.

Kûqkaiĭqsoûqsĭnĭ kotomĭtam = You should feed your dog.

Inanimate:—

Nina okoa = My father's house.

Tcĭma kĭtseetan = Where is your saddle?

Amo nokoa = This is my home.

Amosts natsĭkĭsts = These are my boots.

Kĭtcĭnakasem akûsĭo = Your waggon is old.

Otsĭstotoqsĭsts awaitcinĭmae = She mends her clothes.

Names of parts of the body beginning with *M*, when put in the possessive case, drop the letter *M*: as,

Mĭwapspĭ	= The eye.	Nĭwapspĭ	= My eye.
Mokoantsĭ	= The abdomen.	Nokoantsĭ	= My abdomen.
Moqkĭnĭstĭs	= The elbow.	Noqkĭnĭstĭs	= My elbow.
Maâye	= The mouth.	Naâye	= My mouth.

Some nouns, when put in the possessive case, take the letter *M* as their terminal letter: as,

Manĭkûpĭ = A young man.

SINGULAR.

Nĭtanĭkûpĭm = My young man.
Kĭtanĭkûpĭm = Thy " "
Otanĭkûpim = His " "

Exclusive.

Nĭtanĭkûpĭmĭnan = Our young man.

Inclusive.

Kĭtanĭkûpĭmĭnon = Our young man.
Kĭtanĭkupĭmĭwa = Your " "
Otanĭkûpĭmĭwa = Their " "

PLURAL.

Nĭtanĭkûpĭmĭks = My young men.
Kĭtanĭkûpĭmĭks = Thy " "
Otanĭkûpĭmĭks = His " "

Exclusive.

Nĭtanĭkûpĭmĭnanĭks = Our young men.
Kĭtanĭkûpĭmĭnonĭks = Our " "
Kĭtanĭkûpĭmĭwaĭks = Your " "
Otanĭkûpĭmĭwaĭks = Their " "

The Double Possessive.

The following words declined will show the method adopted in forming the double possessive:

SINGULAR.

Noqkoa otometamae = My son's dog.
Koqkoa otometamae = Thy " "
Oqkoye otometamae = His " "

Exclusive.

Noqkunan otometamae = Our son's dog.

Inclusive.

Koqkunon otometamae = Our son's dog.
Koqkoawa otometamae = Your " "
Oqkoyewa otometamae = Their " "

Nĭsoqkoa = My daughter's son.
Kĭsoqkoa = Thy " "
Osoqkoye = His " "

Exclusive.

Nĭsoqkunan = Our daughter's son.

Inclusive.

Kĭsoqkunon = Our daughter's son.
Kĭsoqkoawa = Your " "
Osoqkoyewa = Their " "

PLURAL.

Nĭsoqkoaks = My daughter's sons.
Kĭsoqkoaks = Thy " "
Osoqkoyeaks = His " "

Exclusive.

Nĭsoqkunanaks = Our daughter's sons.

Inclusive.

Kĭsoqkunonaks = Our daughter's sons.
Kĭsoqkoawaks = Your " "
Osoqkoyewaks = Their " "

Another form of the same.

SINGULAR.

Nĭtûna oqkoye = My daughter's son.
Kĭtûna oqkoye = Thy " "
Otûna oqkoye = His " "

Exclusive.

Nĭtûnĭnan oqkoye = Our daughter's son.

Inclusive.

Kĭtûnĭnon oqkoye = Our daughter's son.
Kĭtûnawa oqkoye = Your " "
Otûnawa oqkoye = Their " "

PLURAL.

Nĭtûna oqkoyeks = My daughter's sons.
Kĭtûna oqkoyeks = Thy " "
Otûna oqkoyeks = His " "

Exclusive.

Nĭtûnĭnan oqkoyeks = Our daughter's sons.

Inclusive.

Kĭtûnĭnon oqkoyeks = Our daughter's sons.
Kĭtûnawa oqkoyeks = Your " "
Otûnawa oqkoyeks = Their " "

Decline Nĭsotûna = my daughter's daughter, Nĭtûna otûna = my daughter's daughter, and Nĭtûna okoa = my daughter's house, in the same manner as an exercise.

The Expression "Own."

For the expression "own," "my own," etc., there is a particular form used, consisting of the personal pronoun and Neneta, Keneta, Oneta, joined to the noun.

A letter is inserted in some words in accordance with the laws of euphony.

ANIMATE NOUN.

Nĭstoa Nenetakotas = My own horse.
Kĭstoa Kenetakotas = Thy own horse.
Ostoye Onetakotas = His own horse.

Exclusive.

Nistunan Nenetakotasĭnan = Our own horse.

Inclusive.

Kistunon Kenetakotasĭnon = Our own horse.
Kistoawa Kenetakotasĭwao = Our own horse.
Ostoyewa Onetakotasĭawa = Their own horse.
Nistoa Nenetakotasĭks = My own horses.
Kistoa Kenetakotasĭks = Thy own horses.
Ostoye Onetakotasĭks = His own horses.

Exclusive.

Nistunan Nenetakotasĭnanĭks = Our own horses.

Inclusive.

Kistunon Kenetakotasĭnanĭks = Our own horses.
Kĭstoawa Kenetakotasĭwawiks = Your own horses.
Ostoyewa Onetakotasĭawawĭks = Their own horses.

INANIMATE NOUN.

Nĭstoa Nenetaksĭstoûn = My own knife.
Kĭstoa Kenetaksĭstoûn = Thy own knife.
Ostoye Onetaksĭstoûn = His own knife.

Exclusive.

Nistunan Nenetaksĭstoûnĭnan = Our own knife.

Inclusive.

Kistunon Kenetaksĭstoûnĭñon = Our own knife.
Kĭstoawa Kenetaksĭstoûnĭwa = Your own knife.
Ostoyewa Onetaksĭstoûnĭawa = Their own knife.
Nĭstoa Nenetaksĭstoaks = My own knives.
Kĭstoa Kenetaksĭstoaks = Thy own knives.
Ostoye Onetaksĭstoaks = His own knives.

Exclusive.

Nistunan Nenetaksĭstonanaks = Our own knives.

Inclusive.

Kistonon Kenetaksĭstononaks = Our own knives.
Kĭstoawa Kenetaksĭstoawaks = Your own knives.
Ostoyewa Onetaksĭstoawaks = Their own knives.

Examples.

Nĭstoa Nenetakokoa = My own home.
Nĭstoa Nenetaksĭnaksĭn = My own letter.
Nĭstoa Nenetanamau = My own bow, or gun.
Nĭstoa Notoûnĭ = My own knife.

This is a different form for the same inanimate noun as given above.

The accusative case shows the object of the verb.

The accusative animate is expressed by adding *wa* as a suffix to the singular.

Nĭtûkomimao pukawa = I love a child.
Akomimeo pukawa = He loves a child.
Nĭtûkomimao ponokamĭtawa = I love a horse.

The accusative plural is formed by adding *a* to the plural as a suffix, as

Nĭtûkomimaks pukaksa = I love children.

The accusative inanimate is expressed by adding *awa* as a suffix.

Nĭtûsatciqp sĭnaksĭnawa = I read a letter or book; literally, I look at a letter. There is no word in the language to express our English phrase "to read".

Nĭtapĭstotsiqp napyoyĭsa = I built a house.

Declension of Noun.

Animate Noun.

SINGULAR.		PLURAL.	
Nom.—Imeta	= A dog.	Nom.—Imetaks	= Dogs.
Poss.—Ometa	= His dog.	Poss.—Ometaks	= His dogs.
Acc.—Imetawa	= A dog.	Acc.—Imetaksa	= Dogs.

Inanimate Noun.

SINGULAR.		PLURAL.	
Nom.—Sĭnaksĭn	= A letter.	Nom.—Sĭnaksĭsts	= Letters.
Poss.—Otsĭnaksĭn	= His letter.	Poss.—Otsĭnaksĭsts	= His letters.
Acc.—Sĭnaksĭnawa	= A letter.	Acc.—Sĭnaksĭstsa	= Letters.

Terms of Relationship.

Nina	= My father.
Niksĭsta	= My mother.
Nĭskûn	= My younger brother.
Neesa	= My elder brother.
Nĭsĭsa	= My younger sister—Nĭtakim.
(Female speaking)	*(male speaking).*
Ninĭsta	= My elder sister.
Noqkoa	= My son.
Nĭtûna and Nĭtûnis	= My daughter.
Noma	= My husband.
Nĭtoqkeman	= My wife.
Nĭstûmo	= My brother-in-law, *i.e.*, husband of my sister.
Nĭstûmoqko	= My brother-in-law, *i.e.*, brother of my wife.
Nokos	= My child.
Nĭsokos	= My grandchild.
Nĭsoqkoa	= My grandson.
Nĭsotûna	= My grand-daughter.

THE PRONOUN.

A pronoun is a word used instead of a noun.

There are six classes of pronouns—personal, possessive, demonstrative, interrogative, relative, and indefinite.

THE PERSONAL PRONOUN.

Personal pronouns are substitutes for the names of persons or things. They are called personal because they designate the person of the noun which they represent.

INFLEXION OF THE PERSONAL PRONOUN.

	BLACKFOOT.	CREE.	OJIBWAY.
I	Nistoa	Niya	Nĭn
Thou	Kistoa and Sistoa	Kiya	Kĭn
He, she, it	Ostoye	Wiya	Wĭn
Exclusive.			
We	Nistunan	Niyanan and Niyan	Nĭnawĭnd
Inclusive.			
We	Kistunon	Kiyanan	Kĭnawĭnd
You	Kistoawa	Kiyawa	Kĭnawa
They	Ostoyewa	Wiyawa	Wĭnawa

There is a peculiarity in the pronoun especially observable in the Ojibway, Cree and Blackfoot languages, namely the *double first person plural.* This has already been explained under the *exclusive* first person plural and *inclusive* first person plural. As this is a highly important distinction, which ensures definiteness of expression, I shall repeat the explanation in another form, even at the expense of redundancy.

In the *exclusive* first person plural *Nistunan*, the persons speaking do not include the second persons, that is the persons addressed. This exclusive plural includes only the first and third persons, viz.:—He and I; or, They and I.

The *inclusive* first person plural or second first person plural *Kistunon*, includes the persons addressed, and not the third persons, viz.:—Thou and I; or, You and I. Great care must be exercised in grasping intelligently and thoroughly this distinction, as it is very extensively used in the language, especially in the verb.

The personal pronoun is used with verbs in a contracted form.

In the singular number, the first and second personal pronouns are used as prefixes, and are called article pronouns.

Nĭstoa being contracted to N and Nĭ, and Kĭstoa to K and Kĭ.

In accordance with the laws of euphony, inducing harmony of sound, the letter *t* is oftentimes inserted between the pronominal prefix or article pronoun and the tense root of the verb, and sometimes before the root of the verb itself, as

Nĭ-t-awan-ĭ	= I say.	Nĭ-t-an-ĭ	= I said.
Kĭ-t-awan-ĭ	= Thou sayest.	Kĭ-t-an-ĭ	= Thou saidst.
awan-ĭo	= He says.	an-ĭo	= He said.

Sometimes the contracted form of the third personal pronoun is attached to verbs, with the aid of a euphonic letter, as O-t-se-kamus-ĭo = He stole. Generally, however, the third person of the verb has not any article pronoun, the person being fully expressed by the inflexion of the verb.

The Expression Self.

For the expressions *self* and *selves* the particle *kauk* is added as a suffix to the personal pronouns, as:

	Nĭstoakauk	= Myself.
	Kĭstoakauk	= Thyself.
	Ostoyekauk	= Himself, herself, itself.
(*Exclusive*)	Nistunanakauk	= Ourselves.
(*Inclusive*)	Kistunonakauk	= Ourselves.
	Kĭstoawakauk	= Yourselves.
	Ostoyewakauk	= Themselves.

THE POSSESSIVE PRONOUN.

Possessive pronouns receive their distinctive name from the idea of possession being inherent in them.

There are two classes of possessive pronouns: separable and conjunctive.

The *separable* possessive pronouns are not joined to another word, but stand alone, although related to other words in the same sentence.

In the plural number they agree with the animate and inanimate nouns which they represent.

When representing a noun in the singular number, the animate and inanimate forms are alike.

	BLACKFOOT.	OJIBWAY.
Mine	Nĭtsĭnan	Nĭn
Thine	Kĭtsĭnan	Kĭn
His, hers, its	Otsĭnan	Wĭn
Exclusive.		
Ours	Nĭtsĭnanan	Nĭnawĭnd
Inclusive.		
Ours	Kĭtsĭnanon	Kĭnawĭnd
Yours	Kĭtsĭnanawa	Kĭnawa
Theirs	Otsĭnanawa	Wĭnawa

Animate Form.

Mine = Nĭtsĭnanĭks.
Thine = Kĭtsĭnanĭks.
His, hers, its = Otsĭnanĭks.
(*Exclusive*) Ours = Nĭtsĭnananĭks.
(*Inclusive*) Ours = Kĭtsĭnanonĭks.
Yours = Kĭtsĭnanawaks.
Theirs = Otsĭnananĭks.

Inanimate Form.

Mine = Nĭtsĭnanĭsts.
Thine = Kĭtsĭnanĭsts.
His, hers, its = Otsĭnanĭsts.
(*Exclusive*) Ours = Nĭtsĭnananĭsts.
(*Inclusive*) Ours = Kĭtsĭnanonĭsts.
Yours = Kĭtsĭnanawasts.
Theirs = Otsĭnananĭsts.

For the expression *All these are mine*, the pronoun *Nĭtsĭnanĭa* is used, which is declined in the same manner as Nĭtsĭnan.

Conjunctive possessive pronouns are joined to nouns, and thus are formed nouns in the possessive case. These are the same as the contracted forms of the personal pronouns, which are used as article pronouns. They are thus expressed in conjunction with nouns and verbs:

1st person—N, Nĭ, Nĭt, Nĭts, and other vowels united with N

2nd person—K, Kĭ, Kĭt, Kĭts, also Ko, Kû, etc.

3rd person—O, Ot, Ots.

Examples of the conjunctive possessive pronouns will be found in the treatment of the declension of the noun in the possessive case.

The following examples will also show the true meaning:

Puqsĭpĭpotot nĭsokasĭm = Bring my coat.
Puqsĭpĭpes notasa = Bring my horse.
Noqkokĭt nĭtsopatsĭs = Give me my chair.

THE DEMONSTRATIVE PRONOUN.

The demonstrative pronouns point out distinctively the persons or things spoken of. There are two forms, viz.: animate and inanimate.

	BLACKFOOT.	CREE.	OJIBWAY.
ANIMATE.			
This.	Amo and Amoĭa.	Awa.	Â.
That.	Oma.	Ûna.	Â.
This or that.	Anauk.		
These.	Amoksĭ and Amoksĭm.	Okĭ.	Ogaw.
Those.	Omeksĭ and Omeksĭk.	Ûnĭkĭ.	Ĭgĭo.
These or those.	Anĭksauk.		
INANIMATE.			
This.	Amo and Amoĭa.	Oma.	Aw.
That.	Omem.	Ûnima.	Ĭo.
This or that thing.	Animauk.		
These.	Amosts and Amostsĭm.	Ohĭ.	Onaw.
Those	Omests and Omestsĭm.	Ûnĭki.	Ĭnĭo.
These or those things.	Anĭstsauk.		

Examples of the Animate Demonstrative.

Amo notas = This (is) my horse.
Amoksĭ notasĭks = These (are) my horses.
Amoksĭ imetaks = These dogs.
Amakekwân = This girl.
Omeksĭ ponokamĭtaks = Those horses.
Oma matûpĭ skunatapĭo = That person is strong.

Examples of the Inanimate Demonstrative.

Amo nĭtsapyoyĭs	= This (is) my house.
Amanakas	= This wagon.
Amosts matakĭsts	= These potatoes.
Omests sĭnaksĭsts	= Those letters.

THE INTERROGATIVE PRONOUN.

Interrogative pronouns are those which are used for asking questions.

		BLACKFOOT.	CREE.
	ANIMATE.		
(Sing.)	Who	Tûká	Awena
	Which	Táa	Keko
	Who is he	Tûkats	
(Plu.)	Who	Tûkaks	Awenĭkĭ
	Which	Tciaks	Tanûnĭkĭ
	INANIMATE.		
(Sing.)	Which	Tcia and Tcima	Keko and Tanĭma
	What	Ûqsa	Kekwaĭ
	What	Tcanĭstapĭ	
	What is it	Tcanistapsio	
(Plu.)	Which	Tciasts	Taniwihĭ
	What	Tciáa	Kekwaya

Examples.

Tcakĭtawanĭ = What dost thou say? (present tense).
Tcakitanĭ = What dost thou say? What didst thou say?

This latter (imperfect tense) form is used more frequently by the Indians, instead of the present tense, but it has the force of the present.

Tcawanĭo = What does he say?
Tuka kĭtûqkoka = Who gave you?
Tcanĭstaoats = What did he say?

THE RELATIVE PRONOUN.

Relative pronouns serve to connect the clause of a sentence with its antecedent, and to describe or modify it.

Animate.	SINGULAR.	PLURAL.
Who.	Anûk.	Anûksĭsk.

Inanimate.	SINGULAR.	PLURAL.
Which.	Anĭk.	Aṇĭstsĭsk.
What.		

The particles *oqpĭ* and *yiqpĭ* are used as suffixes to express the relative *what*, as :

Anioats nĭtûqkoyiqpĭ = Did he say what he gave me?
Nĭtûksĭniqp kĭtûqkotoqpĭ = I know what I gave you.

The compound relative pronoun *whoever* is expressed by the particle *ĭst*, as when alone

Ĭstaowa = Whoever.
Ĭstûtomae matsĭsae = Whoever wants (this house) can have it.
Ĭstaowa ûqkĭtotasĭn = Whoever wants this horse can have him.

THE INDEFINITE PRONOUN.

Indefinite pronouns represent objects indefinitely. These pronouns have animate and inanimate forms, and are separable and conjunctive.

Animate and Separable.

Ĭnûqkae = Somebody.
Akaiem = Many.
Noqketsĭm = Another, a different one.
Istcĭkĭ = Another, an added one, *plural* Ĭstcĭkĭks.
Ĭnatoqsĭ = Few.
Matoqketse = Still another.

Inanimate and Separable.

Akauo = Many and much.
Aietcĭnĭka = All.
Noqketsĭm = Another.
Istcĭkĭ = Another, *plural* Istcĭkĭsts.
Nĭtapĭ = Another, the other.
Matoqketse = Still another.

There are conjunctive indefinite pronouns which are used only when joined to a word, as

Kûna = All, *e.g.*, Kûnaitûpĭks = All the people.
Kûnoanĭstcĭsa = Tell everyone to come.
Noqketse = Another, *e.g.*, Noqketsetûpĭ = Another person.

THE ADJECTIVE.

An adjective is a word used to qualify nouns.

There are four classes of adjectives, viz., separable, conjunctive, verbal and numeral.

There are also two forms of the adjective, animate and inanimate, agreeing with the nouns which they represent.

Separable Adjectives.

Aqse	= Good.	Sokape	= Perfect.
Matûqse	= Bad (evil).	Makape	= Dirty—rotten. also applied to wrong-doing.
Omûqkĭme	= Big.	Ĭnakĭme	= Little.
Spiké	= Thick.	Stoyé	= Cold.
Ksĭstoyé	= Warm.	Soksĭmé	= Heavy.

Inakime=little, becomes when joined to nouns the diminutive *ĭnûk*.

Separable adjectives are sometimes contracted in form and united with nouns, as

Aqsoskĭtsĭpupĭ = Good heart.
Omûqkĭapyoyĭs = A big house.
Omûqsĭnina = A great chief.
Makapoqsokoyĭ = The dirty road, the evil way.

Omûqkokaio = a big bear, from Omûqkimi, big, contracted to Omûqko and Kaio = a bear.

Conjunctive Adjectives.

Conjunctive adjectives are joined to nouns and verbs. When severed from their proper connection, they lose their meaning and cannot be translated, as :

Mane = new or young. Manepuka = a young child, an infant. Manepuka aikamotao = the infant is better. Kokinan manyoskitsipûpi = give us new hearts.

Nato = Holy. Natoapsinaksin = the holy book, *i.e.*, the sun-book, the Bible. Natoapekwân = the holy man, a missionary. Natoyetcistcikwi = the holy day, the Sabbath. This adjective is derived from natos = the sun, which is applied to spiritual things in the sense of being holy. Thus Natoapikwan is composed of *natos*, the sun, *api*, the contracted form in word formation of *matûpi*, a person, and *kwân*, the singular personal ending.

The separable adjectives are capable of being verbalized by the addition of the verbal suffix, and become adjective verbs, as :

Aqse	= Good.	Aqseo	= It is good.
Matûqse	= Bad.	Matûqseo	= It is bad, *i.e.*, it is not good, *ma* being the negative particle.
Makape	= Bad.	Makapeo	= It is bad.

He is wicked (moral badness).

Omûqkime	= Big.	Omûqkimeo	= It is big.
Inakime	= Small.	Inakimeo	= It is little.
Sokape	= Perfect.	Sokapeo	= It is perfect.
Stoye	= Cold.	Stoyeo	= It is cold.
Ksistoye	= Hot.	Ksistoyeo	= It is hot.
Spike	= Thick.	Spikeo	= It is thick.
Akaise	= Old.	Akaiseo	= It is old.
Matcaps	= Foolish.	Matcapseo	= He is foolish.
Kimataps	= Poor.	Kimatapseo	= He is poor.
Aioqtokos	= Sick.	Aioqtokoseo	= He is sick.
Skunataps	= Strong.	Skunatapsio	= He is strong.
Akotcaps	= Rich.	Akotcapseo	= He is rich.

Comparison of Adjectives.—Adjectives have three degrees of comparison, the positive, comparative and superlative. The positive degree expresses the adjective in its simple form, as

Stoye = Cold. Aqse = Good.

The comparative degree is formed by adverbial prefixes which are variously contracted. The particles attached to the adjectives are, E, Ek, Ekĭ, Eks, Ekû, Ekû, as :

Ekstoye	= Very cold, colder.
Ekskaqse	= Very good, better.
Ekskunataps	= Very strong, stronger.

The superlative degree is formed by prolonging the adverbial prefix of the comparative degree, as:

Ekstoye = Coldest, extremely cold.
×
Ekskaqse = Best, the highest good.
×
Ekskunataps = Strongest, the greatest strength.
×

Examples:

Akaiem = Many.
Ekûkaiem = Very many.
Ekûkaiem = The most, the greatest number, a very great number.
×
Akauo = Much.
Ekûkauo = Very much.
Ekûkauo = Very much.
Ekûkauo = The most, the greatest.
×

There is a negative form of the adjective expressed by prefixing the negative particles *Ma* and *Matsi*, as:

Epoyapetsi = A great talker.
Matsipoyapetsi = A silent person.
Aqse = good. Matûqse = Bad.
Skunataps = Strong.
Matskunataps = Not strong, weak.

Numeral Adjectives.

CARDINALS.

Nitukskûm	= One.	Nao	= Six.
Natokûm	= Two.	Ikĭtceka	Seven.
Niokskûm	= Three.	Nanĭsoyĭm	Eight.
Nisoyĭm	= Four.	Naniso	"
Nise	= "	Pikso	Nine.
Nĭsetcĭ	= Five.	Kepo	Ten.
Nĭseto	= "	Kepĭ	"

Kepĭ Nĭtsekupût = Eleven. Natsĭpe Nitsĭkupût = Twenty-one.
" Natsekupût = Twelve. " Natsikupût = Twenty-two.
Kepi Niokupût = Thirteen. " Niokupût = Twenty-three.

Kepi Nĭsokupût = Fourteen.
" Nisetcĭkupût = Fifteen.
" Naokupût = Sixteen.
" Ikĭtcekupût = Seventeen.
" Nanisokupût = Eighteen.
" Piksokupût = Nineteen.
Natsĭpe = Twenty.

" Nisokupût = Twenty-four.
" Nisetcĭkupût = Twenty-five
" Naokupût = Twenty-six.
" Ikĭtcekupût = Twenty-seven.
" Nanisokupût = Twenty-eight.
" Piksokupût = Twenty-nine.

Niĭpe = Thirty.
Nĭsĭpe = Forty.
Nĭsetcĭpe = Fifty.
Naoĭpe = Sixty.
Ikĭtcĭpe = Seventy.
Nanĭsĭpe = Eighty.
Piksĭpe = Ninety.
Kepĭpe = One hundred.

Kepĭpe kĭ Nĭtsekupût = One hundred and one.
" " Nĭsetcĭkupût = One hundred and five.
" " Kepo = One hundred and ten.
" " Natsĭpe = One hundred and twenty.

Natoka kepĭpe = Two hundred.
Niokska " = Three hundred.
Nĭso " = Four hundred.
Nĭsĭto " = Five hundred.
Nao " = Six hundred.
Ĭkĭtceka " = Seven hundred.
Nanĭso " = Eight hundred.
Pikso " = Nine hundred.
Kepĭpepe = One thousand.
Naniso kepĭpepe = Eight thousand.
Kepi " = Ten thousand.
Niĭpe " = Thirty thousand.

In reckoning from eleven to twenty Kepi is generally unused, and the simple form is then:

Nĭtsekupût = Eleven.
Natsekupût = Twelve.
Niokupût = Thirteen, etc., etc.

Some of the numerals have two and three words for the same number, as:

Two	= Natokûm	and	Natoka.
Three	= Niokskûm	"	Niokska.
Four	= Nĭsoyĭm	"	Nĭso.
Five	= Nĭsetcĭ	"	Nĭsĭto.
Ten	= Kepo	"	Kepĭ.

There is a form of broken speech also in use in reckoning, as:

Kepĭ mĭstaput nĭsetcĭ = Fifteen.
Kepĭ mĭstaput nao = Sixteen.
Kepĭpe naokupûtĭpĭ mĭstaput nĭsetcĭ = One hundred and sixty-five.

Numerals are generally combined with nouns, though they are separable adjectives, as:

Nĭtsepoqse	= One dollar.	Naotûpe	= Six persons.
Niokskotas	= Three horses.	Ĭkĭtcetûpe	= Seven "
Nĭtsetûpe	= One person.	Nanisotûpe	= Eight "
Natsetûpe	= Two persons.	Piqsotûpe	= Nine "
Niokskatûpe	= Three "	Kepĭtûpe	= Ten "
Nĭsotûpe	= Four "	Nĭsoqkûtseo	= Four feet.
Nĭsetcĭtûpe	= Five "		

Nĭtsĭnoaĭaks nanĭsoyĭmĭao ponokamĭtaks = I saw eight horses. Kepĭ notasĭks = I own ten horses. Literally—*ten, my horses.* This is the mode of expressing possession in use among the Indians.

Tcanĭstcĭsa kĭtakotoqpa = When will you return? Nao tcĭstcĭkwĭsts nûqsĭkûmĭtoto = Perhaps I shall return in six days.

The natives generally use the term *nights* where the white men say *days*, but the advent of the white man has introduced modes of speech when speaking to white men, which are not employed by the natives when in conversation among themselves.

Natokae tcĭstcĭkwee nĭtapautakĭ kĭ nĭsoyĭmĭ sûpoksĭks notoqkwenanĭ = I worked two days and earned four dollars.

Etcĭpustoyemĭo akapyoyis = He lived in town ten years.
Nĭtukskûmats = Is there one? Kepĭoats = Are there ten?

MULTIPLICATIVE NUMERALS.

Nitukskaowa	= Once.	Naoyaowa	= Six times.
Natokaowa	= Twice.	Ĭkĭtcekayaowa	= Seven "
Niokskaowa	= Three times.	Nanĭsoyaowa	= Eight "
Nĭsoyaowa	= Four "	Piksoyaowa	= Nine "
Nĭsĭtoyaowa	= Five "	Kepoyaowa	= Ten "

Kepĭ nĭtsĭkupûtoyaowa = Eleven times.
" natsĭkupûtoyaowa = Twelve "
" niokupûtoyaowa = Thirteen "
" nĭsokupûtoyaowa = Fourteen "

All the other multiplicative numerals are formed on the same plan by adding *yaowa* to the contracted forms of the cardinal numbers.

Tcanĭtco kĭtsĭtûpoqsĭststcĭ akapyoyis = How many times did you go to town? Nĭsoyaowa nĭtsĭtûpoqsĭstcĭ = I went four times.

Ordinals.

Petsĭstoye	= First.	Omoqsĭsĭtûqp	= Fifth
Omoqsĭstokûqp	= Second.	Omoqtaoqp	= Sixth.
Omoqsoqskuqp	= Third.	Omoqtokĭtcekûqp	= Seventh.
Omoqsĭsoqp	= Fourth.	Omoqtanĭsoqp	= Eighth, etc.

Numerical Combinations.

Aq and Aqk when used in combination with a number mean *perhaps*, as:

Aqkĭtukskûm	= Perhaps there is one.		
Aqsĭstokûm	= Perhaps there are two.		
Aqsokskûm	= " "	three.	
Aqsĭsoyim	= " "	four.	
Aqsĭsĭto	= " "	five.	
Aqkao	= " "	six.	
Aqkĭtcekûm	= " "	seven.	

The other combinations are formed on the same plan.

Name combined with numbers signifies *only*.

Nametukskûm	= Only one.	Namao	= Only six.
Namestokûm	= " two.	Namoqkĭtcekûm	= " seven.
Namcokskûm	= " three.	Namanĭsoyĭm	= " eight.
Namesoyĭm	= " four.	Namepiqso	= " nine.
Namesĭto	= " five.	Namekepo	= " ten.

There is another method of expressing this phrase, as:

Aistokûm = Only two. Aiokskûm = Only three, etc.

Numerical Expressions of Time.

Stoye	= Winter.	Nepoyī	= Last summer.
Ĭstoyīsī	= Next winter.	Mokoye	= Autumn.
Akûtstoye	= Last winter.	Motoye	= Spring.
Nepus	= Summer.		

Nītukska stoye	= One winter or one year.
Nītukska natosī	= One month.
Tcanīstceo	= What time is it?
Kûtaumûspiksīstcīko	= Is it early in the day?
Tcanīstconī kesomī	= How old is the moon?
Anokī tcīstcīko	= Half a day.
Sûpoksī tcīstcīko	= A whole day.
Ĭnûkanauksī tcīstcīko	= One fourth of a day.

Natos = the sun. This is often used in common for *the moon*, and for *a month.*

The natives have names for the months peculiar to themselves, as:

Pûke-pīstce	= Choke-cherry month.
Saatos	= The month the ducks arrive.
Saaksīstûpo	= The month the ducks depart.
Omûqkopotao	= The month of the big snow.

Anuqk	= Now.
Anuqk tcīstcīkwe	= To-day.
Kokose	= Night.
Kokoye	= Last night.
Anuqk kokose	= To-night.
Âtakose	= Afternoon.
Ototcīkûqtcistcīkwe	= Noon.
Apĭnakwûs	= To-morrow.
Matunye	= Yesterday.
Matunyīs	= To-morrow.
Mīstapatunye	= Day before yesterday.
Mīstapĭapĭnakwûs	= Day after to-morrow.

Apĭnako	= To-morrow at daybreak.
Tcĭstcĭkenûts	= Daylight.
Askenûts	= Darkness.
Kĭskĭnatunye	= Sunrise.
Aisokûtoyetcĭstcĭkwe	= Sunday is ended.

Numerical Expressions of Money.

Mikskĭm	= Metal, a general term for money.
Ĭtûqpumope	= The thing to trade with, money.
Nĭtsapoqse	= One dollar.
Natokûm sapoqse	= Two dollars.
Omuqkûnauks	= The large half—fifty cents.
Ĭnûkûnauks	= The small half—twenty-five cents.

Niokska Ĭnûkûnauks = The three small halves—seventy-five cents. Omûqkûnauks ke ĭnûkûnauks = The large half and the small half—seventy-five cents. Aipûnasaine = A term for five and ten cents; literally, the thing to cry over at night, and in the morning the weeping is at an end. The natives explain this term by saying that the piece of money is so small that when they look at it at night they begin to weep; and in the morning, when they again look at it, they say it is foolishness to weep over such a small thing, and they cease crying. Sûpoksĭ, the term for one dollar, means a whole thing.

The Adverb.

There are several kinds of adverbs, which are classified according to their signification.

Adverbs of Time.

Anuqk	Now.
Kĭnuqka	And now. Just now.
Anuqk tcĭstcĭkwe	= To-day.
Anuqk kokose	= To-night.
Âtakose	= Afternoon.
Matomoqts	= Formerly. Some time ago.
Mĭsamoe	= Long ago.
Matomaisûmo	= Not long ago.
Matcĭsûmo	= " " "
Ûniqka	= Then. At that time.

Sakooqts	= Afterwards. By and bye.
Matunyĭs	= To-morrow.
Apĭnakwûs	= "
Matunye	= Yesterday.
Aisûmoye	= Long ago.
Kĭpe	= Soon. In a short time.
Sake	= Still.
Oké	= Already.

Aksk, an adverbial particle = much, as *aksk*aisotao = It will rain heavily. Ako = much, as *ako*awûqsin = plenty to eat.

Adverbs of Place.

Tcima	= Where.	Astooqts	= Near.
Nats	= "	Astceo	= Near.
Tcia	= "	Pieqtce	= Far off.
Anom	= Here.	Pio	= " "
Kinom	= Just here.	Spoqt	= Above.
Oma	= There.	Spoqtcĭm	= "
Oma	= Yonder.	Stûqts	= Below, under.
Omem	= There.	Stûqtcĭm	= " "
Matomoqts	= Before.	Saoqts	= Outside.
Aptûoqts	= Behind.	Saoqtcĭm	= "

Pistoqts and Pĭstoqtcĭm	= Inside.
Satoqts and Satoqtcĭm	= Across.
Osoqts and Osoqtcĭm	= Backwards.
Sapoqts and Sapoqtcĭm	= Sidewards.
Etomoqts	= Forward.
Sakooqts and Sakooqtcĭm	= After.
Etcĭnastceo	= Everywhere.
Matsĭkiowats	= Nowhere.
Apûmoqts and Apûmoqtcĭm	= Across the river.
Ametoqts and Ametoqtcĭm	= Up the river, westward.
Pinapoqts and Pinapoqtcĭm	= Down the river, eastward.
Amĭskapoqts and Amĭskapoqtcĭm	= Southward.
Apûtûsoqts	= The north. Northward.
Kiomĭ	= There.
Kĭa	= Come on.
Kûko	= Go on.

Adverbs of Interrogation.

Tcanĭstce = When was it?
Tcanĭstcĭs = When will it be?
Tcanĭstcĭsûmo = How long ago?
Tcanitcĭm = How many?
Tcanitcaw = How much?
Tcanistcĭpio = How far is it?
Tcanĭstcĭtûpĭ = How many people?
Tcĭma = Where.
Nats = "
Ûnats = "
Tcaa = "
Ûqsa = "

Adverbs of Quantity.

Akaiem = Many.
Akauo = Much.
Matakaiem = Few.
Matakauo = "
Pĭstcĭkwe = Little
Ĭnakotsĭs = "
Ĭnatoqtseo = Less.
Ûnyae = Enough.
Ĭstcĭke = More.
Anaukoqts = Half.
Aitcĭnĭka = All.

Adverbs of Manner.

Sapûnĭstce = Collectively.
Netoyé = Alike.
Makape = Badly, wrong.
Hûné = In that manner.
Ekska = Very.
Noqketcĭm = In another way, differently.
Kipé = Quickly.
Ksĭstoqts = Freely, without favour.
Ksĭstape = Aimless, fruitless.
Ekĭne = Slowly, gently.

Adverbs of Comparison.

Akauo and Ĭstcĭke = More.

Adverbs of Affirmation.

Û = Yes.
Emanĭ = That is true, truly.
Hûné = That is it.
Netseo = That is so.

Adverbs of Negation.

Sa = No.
Matcĭstcĭ = None at all.
Maqkakanĭstce = It is not so.

Adverbs of Uncertainty.

Tcaqta = Perhaps.
Matûstcĭniqp = "

The prepositions are almost invariably joined with the noun or verb, and are in this sense particles or inseparable prepositions. Prepositional particles are generally incorporated with the verb, not as a prefix, but immediately after the pronomial particle and before the tense root. The following prepositional particles are found along with others in the language:

Sûp = Into. Mut = From, with. Itûqk = Upon, as:

Anakas *ttûqk*-ĭtaupĭo = He sits upon the wagon.
Akapyoyĭs ni*mût*oto = I have come from town.
Nĭtûqsĭtaupĭo = I am sitting upon.

Anim = In, as: Anim Akapyoyis = In town. Ĭtsoiqtce = In the water. Potoq = To the place, as: Etokûtceo = He sent him. Eto*potoq*kutceo =

THE CONJUNCTION.

Kĭ = And, but.

Sometimes the conjunction is joined to another word, as:

Kĭniqka = And then.
Kioto = And he came, but he came.
Tûka = Because.

INTERJECTION.

Hau! Hau!	= A form of salutation.
Kika	= Wait!
Okĭ	= Now! Come on!
Ekakima	= Courage!
Mâpet	= Be quiet!
Ma	= Here! Take this!
Moayok	= Here it is!
Aia	= Oh! an expression of pain, used only by females.
Mĭstaput	= Get away from here! Go away!
Satcĭt	= Look!

(To be Continued.)

THE DÉNÉS OF AMERICA IDENTIFIED WITH THE TUNGUS OF ASIA.

By Rev. John Campbell, LL.D.

(Read 2nd February, 1897.)

Gutzlaff writes: "The Mantchoos, a Tongoosian race, have, since their conquest of China, become a civilized people. Those who remain in their original country form, nevertheless, a portion of the imperial forces. Every male is obliged to enlist under one of the royal standards, of which there are eight. Many thousands are dispersed throughout the whole Chinese empire, where they are either soldiers or hold the highest offices in the state. They were originally Nomades, in manner not unlike the Mongols, though inferior in courage. The inhabitants of the northern provinces are a miserable race, living almost exclusively upon dried fish." Klaproth says: "All the Tungusian stocks under Chinese sway bear the common name Mandju." The Mantchus, therefore, are simply a section of the Tungus, of whom Klaproth further remarks: "The Tungus have no common or national name, yet most who dwell in Siberia call themselves Boye, Boya or Bye, that is, men (Mantshu beye, body, self). Some give themselves the name Donki, people, whence the name Tungus appears to have arisen. * * * However this may be, it is acknowledged without doubt that the Tungus' name is already very old, for we find it among the Chinese as early as the birth of Christ, when they called this people the Tungchu." Among their tribes, which I shall enumerate later, are those called Djan, Donggo, Djanggia, Dunggia, Dung, and Djang.

Father Morice's able, interesting, and instructive monographs on the Dénés of the far Northwest have had the effect of reviving my interest in the extensive and widely scattered aboriginal population so-called. Just sixteen years ago, within a few days, for it was on the 17th of December, 1880, and I write now on the 22nd, of 1896, I read a paper before the Literary and Historical Society of Quebec, in which, among other things, a comparison was instituted between the Dénés of America and the Tungus of Asia. These peoples are so well differentiated in Asia and in America from neighboring tribes as to make the task of comparison void of much difficulty, the chief want being material on both

sides, although the labors of Fathers Petitot and Morice have done much to fill up gaps on the American side. Writers on Siberia have, unfortunately, acted after the fashion of former describers of the American Indian, by confounding the Tungus with the Tchuktchis and Yakuts, the Koriaks and the Kamtchadales. Apart from Father Morice, and the comparative vocabularies of the Dené dialects taken from the collections of Petitot, Bancroft, Dawson, Tolmie and others, my authorities are rather ancient, but their antiquity is really in their favor, as it represents the two stocks in a native state, unaffected by external influences. For the Tungus, I am indebted to Santini, Martin Sauer, Adelung, Klaproth, and Malte-Brun, and for the Dénés, to Mackenzie and Hearne. I shall have occasion, in making the argument cumulative, to repeat some facts stated by me in a paper entitled "Asiatic Tribes in North America," which was published in the Proceedings of the Institute of 1881, New Series, Vol. 1, Part 2, p. 171.

THE DÉNÉ TRADITION.

Sir Alexander Mackenzie says, concerning the Chipewyans or Chippewyans, who are now called Athapascans and Montagnais: "They have also a tradition amongst them, that they originally came from another country, inhabited by very wicked people, and had traversed a great lake which was narrow, shallow, and full of islands, where they had suffered great misery, it being always winter, with ice and deep snow. At the Coppermine River, where they made the first land, the ground was covered with copper, over which a body of earth had since been collected to the depth of a man's height." Father Petitot has a larger version. "In 1863, the Dénés of Great Slave Lake, whom I questioned as to the place of their origin, told me, 'This is what we know: In the beginning, there lived a great giant named *Jakke-elt-ini* (he whose head sweeps the sky), who barred our entrance to this desert and yet uninhabited land. The men (Dénés), pursued him and killed him. His dead body fell across the two continents, became petrified, and served as a bridge over which reindeer have passed and repassed until our days, from one shore to the other. The feet of the giant rest on the west shore, and his head reaches to Cold Lake." Who does not recognize, under the allegorical form, the narrative of the arrival of the Dénés in America, and the struggles they had to endure there against the barrenness of the soil, and the harshness of the climate? For proof in support, the Dénés call the long Cordillera of the Rocky Mountains, *Ti-honan-kkwene* (the back-bone of the earth), which they observe to run down the length of the continent, and which they regard as the back of the giant that has served as a bridge to these

waves of humanity for passing from Asia to America. As a second proof, they call by the name, *Thi-lan-ottine* (the inhabitants of the top of the head), the Déné tribe which haunts the shores of Cold Lake, where, they say, the head of their giant lies. It is thus easy to see, that by this giant they meant to symbolize their own nation. * * * The Peaux de Lièvre have another version of their arrival in America. Formerly, they say, we dwelt on the shore of a western sea, and our enemies were on the east, but since the earth has changed sides we find ourselves in the east and our enemies in the west. By these enemies they now mean the nation of the *Mollouches* (? Kolush or Thlinket); but, in their tradition, they mention a powerful people who shaved the head, wore wigs, and reduced them to live in slavery."

Mr. W. H. Dall, in his article on "The Origin of the Innuit or Eskimos," published in the first volume of Contributions to North American Ethnology, favors the Asiatic derivation of some of our aborigines; and, from the fact that, at the present day, Behring Strait is frequently crossed by natives on the ice, infers that it constituted a highway for immigrants in the past. He quotes, somewhat disjointedly, from Mr. C. R. Markham's Arctic Paper, of 1878, presented to the Geographical Society of London, as follows: "During the centuries preceding the appearance of the Innuit in Greenland (1349 A.D.), there was a great movement among the people of Central Asia. The pressure caused by invading waves of population on the tribes of northern Siberia drove them still farther to the north. Year after year, the intruding Tartars continued to press on. Their descendants, the Yakuts, pressed on, until they are now found at the mouths of rivers falling into the Polar Sea. But these regions were formerly inhabited by numerous tribes, which were driven away still farther north over the frozen sea. Wrangell has preserved traditions of their disappearance, and in them, I think, we may find a clue to the origin of the Greenland Eskimos. The Yakuts were not the first inhabitants of the Kolyma. The Omoki, the Chelaki, the *Tunguses*, and the Yukagirs, were their predecessors. These tribes have so wholly disappeared that even their names are hardly remembered." Sauer found the Tungus between Irkoutsk and Iakoutsk, the latter being the centre of the Yakuts, whose tradition, reported by him, is that they passed by the Tungus, when migrating from the south, so as not to come into conflict with them. The Russians found this northern spur of the Turkish family in Iakoutsk in 1620. Mr. Dall corrects Mr. Markham in some particulars, and denies that the Yukagirs, Tunguses, etc., have disappeared. The fact that the Mantchus are Tungusic sufficiently disproves Mr. Markham's assertion, but the fact of

Mongol pressure and displacement since the days of Kublai Khan, in the latter part of the thirteenth century, and even before then, cannot be disputed. There was an old civilization at Lake Baikal, as archæological remains attest, long before Kublai's time, and its consequence was the expulsion of nomad, and especially of hunting and fishing, tribes, into the north and east. It is, therefore, most probable that a large body of the Tungus followed the Dakotas and the Eskimos into America over the ice-bridge of Behring Strait, and made their way through the latter to their present habitations, where they are known as the Dénés.

THE TUNGUS AND DÉNÉ TRIBES.

Sauer, towards the close of last century, said: "The Tungoose wander over an amazing extent of ground, from the mouth of the Amour to the Baikal Lake, the rivers Angara or Tungooska, Lena, Aldan, Yudoma, Mayo, Ud, the sea coast of Ochotsk, the Amicon, Kovima, Indigirka, Alasey, the coast of the Icy Sea, and all the mountains of these parts; constantly on the look out for animals of the chase." The names given their tribes by Adelung and Klaproth are largely derived from their places of abode and possessions or mode of life. Thus Klaproth's eleven vocabularies are those of Yeniseisk, the Tshapogirs, Mangaseya, Nertchinsk, Bargusin, Upper Angara, Iakutsk, Ochotsk, the Lamuts, Lower Tungusa, and the Mantchus. Here Tshapogir, Lamut and Mantchu cannot be taken as Tungus titles. The Russians divide them into Horse, Reindeer, Dog, and Foot-going Tungus. The Mantchu, or rather Tungus emperor, Tai-dsu, who overthrew the Ming dynasty, and took possession of the Chinese throne, left on record, through his chronicler, a list of the Tungusic tribes under his sway, about the year 1616 A.D. These are some sixty-five in number, and should be valuable for comparative purposes. The lists of the Mithridates and of the Asia Polyglotta are not quite the same, although Klaproth appears to have been responsible for both. The following table presents the tribal names in alphabetical order, the variants to the right being those of Adelung.

TUNGUSIC TRIBES IN 1616 A.D.

Akiran	
Andarki-Aimun	Andarki.
Antshulaku	Antschulaku.
Antu-Gualgia	
Barde	
Chada	(*Ch* hard.)
Chesiche	Cheshiche.
Chingan	Chinn'kan.
Chuifa	Choifa.
Indachun-takurara-Golo	
Kuala	
Mardun	
Muren	
Namdulu	
Neien	Neyen.
Nimatsha	
Noro	
Olchon	Olcho.

TUNGUSIC TRIBES IN 1616 A.D.—*(Continued).*

Chuneche-Aiman.....	Chuneche.
Chuntshun.....	Chuntschum.
Churcha...	
Chuye	Chuya.
Djaisian	
Djakuma	Dshakumu.
Djakuta	Dshakuta.
Djan.....	Dshan.
Djang	Dshann.
Djanggia.....	Dshann'gia.
Djetschen ni Aiman.... ..	Dshetschen.
Djoogia	Dshoogia.
Djusheri	Dshuscheri.
Donggo	Donn'go.
Dung....	Dunn.
Dunggia.....	
Eche-Kuren	
Elmin	
Feneche	
Fiu	
Fodocho.	
Giamucha	Giamuchu.
Gualtsha.....	
Gunaka-Kuren.....	
Omoche-Shoro	Omochossoro.
Onggolo.....	Onn'golo.
Sachalian-ni-Aiman.....	
Sachaltsha.....	Ssachaltsha
Sakda	Ssakda.
Sargu	Ssargu.
Sibe	Shibo.
Sirachin	Shirachin.
Sirin.....	Shirin.
Suan	Ssuan.
Suifun-Ningguda	Ssuifun ; Ninnguta separate.
Suksuchu-Aiman....	Ssuksuchu.
Tomocho	
Ula.....	
Urgutshen...	
Usui..	Ussui.
Usuri.	
Wanggia.....	Fanggia.
Warka	Uarka.
Wedsi-Aiman..	Uedsi.
Yaran	
Yarchu.....	
Yeche	

Major J. W. Powell, in his elaborate and complete work on American Linguistic Families, gives the following statistics of the Dénés or Athapascans: "The present number of the Athapascan family is about 32,899, of whom about 8,595, constituting the northern group, are in Alaska and British North America, according to Dall, Dawson, and the Canadian Indian Report of 1888; about 895, comprising the Pacific group, are in Washington, Oregon, and California: and abont 23,409, belonging to the Southern group, are in Arizona, New Mexico, Colorado and Indian territory. Besides these are the Lipan and some refugee Apache who are in Mexico. These have not been included in the above enumeration, as there are no means of ascertaining their number." M. Malte-Brun, writing in 1878, gives no statistics of the Mexican group, but furnishes the names of tribes included in it. He says: "The Apaches or Yavipei constitute a barbarous nation which has no fixed abode. They wander through the northern provinces of Mexico, sometimes approaching the vicinity of Zacatecas. In their incursions they commit all sorts of depredations, destroying and burning the pueblos, haciendas, and isolated farms. They are divided into several tribes; the most important are those of the Navajos, Gilenos, Mimbrenos, Chafalotes, Faraons, Llaneros or Lipillanes, and Lipans. They speak the same language, which only varies in accent from tribe to tribe, so as not to hinder their being mutually intelligible. They have no connection in language or origin with the Comanches. The principal dialects of

Apache speech are: the Chimegue, the Yuta, the Muca-Oraive, the Faraon, the Llanero, and the Lipan.

Returning to Major Powell, we find him classifying fifty-three tribes in three divisions, or groups, Northern, Pacific, and Southern, the latter including most of Malte-Brun's Mexicans

DÉNÉ TRIBES IN 1888.

A.—*Northern Group:*

Ah-tena,	Kutchin,	Sluacus-tinnch,
Kaiyuh-khotana,	Montagnais,	Taculli,
Kcaltana,	Montagnards,	Tahltan,
K'naia-khotana,	Nagailer,	Una-khotana.
Koyukuk-khotana,	Slave,	

B.—*Pacific Group:*

Ataakut,	Kwalhioqua,	Taltuctun tude,
Chasta Costa,	Kwatami,	Tceme,
Chetco,	Micikqwutme-tunne,	Tcetlestcan-tunne,
Dakube tede,	Mikono-tunne,	Terwar,
Euchre Creek,	Naltunne-tunne,	Tlatscanai,
Hupa,	Owilapsh,	Tolowa,
Kalts'erea-tunne,	Qwinctunnetun,	Tutu-tunne.
Kenesti or Wailakki,	Saiaz.	

C.—*Southern Group:*

Arivaipa,	Lipan,	Navajo,
Chiricahua,	Llanero,	Pinal Coyotero,
Coyotero,	Mescalero,	Tchikun,
Faraone,	Mimbreno,	Tchishi.
Gileno,	Mogollon,	
Jicarilla,	Naisha,	

The only additions Malte-Brun makes to these are the Chafalotes Chimegues, Muca-Oraives, and Yutas. Some of Major Powell's names are not tribal; a few are English, French, Spanish, fancy and local terms. The Montagnais are the Chippewyans or typical Athapascans and their true name is Déné-Dindjié; the Montagnards are, I suppose, the Tenan-Kutchin; while the Slaves or Dogribs are the Thing-e-ha-dtinne. But the name Mountain Men is also applied to the Tutchone-Kutchin. The classifications of Mr. Dall and Father Morice for the Northern group are somewhat different, and that of the latter, who finds fault with Mr. Dall's, is obscured by English names that are confusing and of very little scientific value. Mr. Dall's list of tribes is as follows:

Abbato-tena,	Koyu-kukh-otana,	Tenan-Kutchin,
Acheto-tinneh,	Kutcha-Kutchin,	Tennuth-Kutchin,
Ahtena,	Nehauni,	Tukkuth-Kutchin,
Daho-tena,	Natsit-Kutchin,	Tutchone-Kutchin,
Han-Kutchin,	Tahto-tinneh,	Unakhotana,
Kai-yuh-kho-tana,	Tehanin-Kutchin,	Vunta-Kutchin.

Father Morice objects to this list, and maintains that the Kutchin tribes of Mr. Dall are, all but one, imaginary. But what shall we say of his own list, followed by the form in each case of the word for man?

Western Dénés:

Chilchotins.....toeni.	Nahanes.....téné.
Carriers.....toené.	

Intermediate Dénés:

Sekanais.....toené.

Eastern Dénés:

Chipewayans.....déné.	Dog-Ribs.....duné.
Cariboo-eaters.....déné.	Slaves.....déné.
Beavers.....dané.	Bad People.....diné.
Yellow-Knives.....déné.	Hares.....déné, adéné.

Northern Dénés:

Loucheux.....dindjyé.

The Carriers, we know, are Dr. Dawson's Takulli, or Teheili, Indians, whom Father Morice calls Tachelh; the Chipewayans are the Déné-Dindjiés; the Beavers are the Tsatens; the Dog-Ribs and Slaves are the Thingehadtinne; and the Bad People, or Mauvais Monde, are said to be of the same stock. Dr. Latham, however, calls the Mauvais Monde the Daho-dinnis, and makes the Hares, or Peau-de-lièvre, and the Slaves one people. The Yellow-Knives, or Copper Indians, are the Ahtena, and the Loucheux are the Kutchins, Father Morice's Tudukh; but who are Cariboo-eaters? I find them neither in Pilling nor Powell, Dall nor Latham, but, as they dwell east of the Chipewayans, they must surely be the Safisadtinne, or, as Latham has it, the See-eessaw-dinneh. Father Morice's deliberate avoidance of personal names has, doubtless, good reasons, but it is unfortunate that one so able to enlighten our darkness on this matter should decline to lift the veil.

As our present purpose is to find tribal names belonging to the Dénés, a series of twenty septs of the three important tribes called by Father Morice, Tsilkohtins, Takelnes, and Tsekehnes, is worthy of presentation.

Hwotsu-tinni,	Otzenne,	Tsat-qenne,
Lthan-tenne,	Saschut-qenne,	Tsekehne,
Nahane,	Takelne,	Tsekehneaz,
Nakraztli-tenne,	Tano-tenne,	Tselohne,
Natlo-tenne,	Tlaz-tenne,	Tsetaut-qenne,
Nazku-tenne,	Tleskohtin,	Tsilkohtin,
Netu-tinni,	Tlothenkohtin,	Yutsut-qenne
Nutca-tenne,	Totat-qenne,	

There are other terms which connect in some way with Déné nomenclature, found in the collections of Pilling and others. We must not be critical about these, for Father Morice, by his silence, forbids us to be so. Some of the names were given by strangers, perhaps; this need not trouble us any more than the titles Allemand, Dutch, and Welsh. Still, others, it is thought, may be Algonquin and even Eskimo words, which, if true, would be awkward. In each case, a resemblance would be mere accidental coincidence and no sign of relation. However, one must work with the material that is to his hand, and trust to the indulgence of truly learned critics, who can appreciate difficulties. The question is: Are the names of the Déné tribes Tungusic? This must be decided by a comparison of our two lists, one of which, it must be remembered, belongs to the early part of the seventeenth century.

Tungus.	*Déné.*
Akiran,	Gileno, Ugalenze,
Andarki-aiman,	Natlo-tenne,
Antshulaku,	Inkaliki,
Antu-Gualgia,	Nagailer,
Barde,	Nulato,
Chada,	Acheto-tinneh,
Chesiche,	Tchishi,
Chingan,	Quinctunnetun,
Chuifa,	Hupa,
Chuneche-aiman,	Kenesti, Nutca-tenne,
Chuntsun,	Knai-kotana,
Churcha, Yarchu,	Chiricahua,
Chuya, Yeche,	Saiaz,
Djaisian,	Tceme,
Djakuma,	Tchikun, Dakube,
Djakuta,	Tukudh, Ataakut,
Djan,	Toene, Otsenne, Suan,
Djang,	Tchanin-Kutchin,
Djanggia, Dunggia,	Dindjye,
Djetschen-ni-Aiman,	Tsatens, Tsatqenne,
Djoogia,	Daho-tena, Tahko-tinneh,
Djusheri, Usuri,	Coyotero, Jicarilla,
Dongo, Dunn,	Tana-tenne,
Eche-kuren,	Kaiyuh-kotana,
Elmin,	Lipan,
Feneche,	Henagi,
Fiu,	Yavipai,
Fodocho,	Hwotsu-tinne,
Giamucha,	Chimegue,
Gualtsha,	Koltshane,
Gunaka-kuren,	Unakhotana,
Kuala, Gualgia, Warka,	Kwalhioqua, Wailukki,
Mardun,	Naltunne-tunne, Nulato,
Muren? Mumren,	Mimbreno, Faraon,
Namdulu,	Natlo-tenne,
Neyen,	Nahane,
Nimatsha,	Navajo,
Ninguta,	Micikqwutme-tunne,
Noro,	Llanero,
Olcho, Olchon,	Wailakki, Lthau-tenne,

Tungus.	*Déné.*
Omocho-soro,	Mescalero,
Ouggolo,	Mogollon,
Sachalian-ni-aiman,	Tsekelne,
Sachaltsha,	Tcetlestcan-tunne,
Sargu,	Sluakus,
Sibi, Shibo,	Safisa-dtinne,
Sirachin,	Kcaltana, Tahltan, Taltuctun-tude,
Shirin,	Tselohne,
Suan,	Otzenne,
Suilun-Ninguda,	Chafalote,
Suksuchu-aiman,	Saschut-qenne,
Tomocho,	Tennuth-Kutchin,
Ula,	Willopah, Tolowa,
Urgutshen,	Ukitce-tenne, Tlatskanai,
Wanggia, Fanggia,	Vunta-Kutchin,
Wedsi-aiman,	Abbato-Tena, Hwotsu-tinni,
Yaran.	Faraon.

The above fifty-seven resemblances may not constitute in themselves proof positive that the present Dénés are the old Tungus tribes, but they clear the way for more definite evidence.

PHYSICAL FEATURES AND HABITS OF THE TUNGUS AND THE DÉNÉS.

Adelung quotes Dr. Redowsky as thus describing the Tungus: "They have flat faces, projecting cheek bones, little, sparkling eyes. The women are almost universally uglier than the men. The Tungus are for the most part, under medium stature and of a feeble bodily frame. They are very lively in conversation, and accompany all their utterances with gesticulations, that sometimes descend to the ludicrous. They are a good-natured, harmless people, quick to be angry, but, on the other hand, that as readily forgive offences. They do not trouble themselves about the future and are not industrious, so long as the necessaries of life—fish and skins—can be procured easily and without trouble. The objects of their luxury, tobacco and brandy, they obtain from the Russians. Of brandy, they are inordinately fond; for a single beer-glass full they will often give ten and more minever skins." Santini's description does not always coincide. He says: "Their faces are round, the cheek-bones high, the lips thick, the eyes small and black, the fore-head small, the ears large, the teeth white, and the hair black. * * * The Tungus are generally tall, athletic and straight. They run with such velocity that I have often seen them overtake the swiftest animal in the forest. Corpulency and deformity of person are blemishes which are seldom seen among them, because from their youth they are trained to the chase and war." Sauer, so far as he goes, agrees rather with Redowsky than with Santini. "They are rather below the middle size and extremely active; have lively, smiling countenances, with small

eyes, and both sexes are great lovers of brandy." Referring to his guides, he says: "I took leave of my Tungoose and their reindeer, and declare that I did so with regret; for I was now an adept in riding, and found them more easy and agreeable than horses; but, above all, I was enchanted with the manly activity of my guides, their independence and contentment. Satisfied with the limited productions of nature, where nature itself seems to forbid the approach of mankind, their astonishing fortitude, keeping in full force every lively sensation of the mind, and surmounting all difficulties, until they obtain the interesting object of their pursuit, inspired me with an ardent desire to participate in their dangers and delights." Elsewhere, he writes, "They are religious observers of their word, punctual and exact in traffic."

Martin Sauer goes on to say: "They seldom reside more than six days in one place, but remove their tents though it be to the small distance of twenty fathoms, and this only in the fishing season, and during the time of collecting berries in such solitary places as are far distant from the habitation of Cossacs. Here they leave their supplies of dried fish and berries in large boxes built on trees or poles, for the benefit of themselves and their tribes in travelling during the winter. Berries they dry by mixing them with the undigested food (lichen) out of the stomach of the reindeer, making thin cakes, which they spread on the bark of trees and dry upon their huts in the sun or wind." In a footnote Sauer remarks regarding their frequent removals: "They say that their tents contract a disagreeable smell from remaining long in one place." "They seem callous to the effects of heat or cold." "They allow polygamy; but the first wife is the chief and is attended by the rest. The ceremony of marriage is a simple purchase of a girl from her father; from twenty to one hundred deer are given,or the bridegroom works a stated time for the benefit of the bride's father. The unmarried are not remarkable for chastity. A man will give his daughter for a time to any friend or traveller that he takes a liking to; if he has no daughter he will give his servant, but not his wives."

Abernethy supplements Sauer's statement regarding marriage: "In the marriage of the Tungusi many ceremonies are used, but the principal and indispensable one is, the offering a plate of corn or some game to the bride by her intended husband. Among several tribes of the Tungusi, marriage is attended with dancing, music and a variety of games and sports, which sometimes continue for several days. There are others who do not exhibit any mark of rejoicing on these occasions. Their courtship is generally of a very short duration. Among some the contract is conducted by their parents, while others allow the lovers to

choose and come to an agreement. They frequently bestow presents on each other, in order to ascertain each other's minds, for the acceptance of these gifts is a sure mark of their consent. The husband generally takes his wife among his own relations, where she spends several weeks, and is entertained with kindness and hospitality." "If the husband be a hunter, which is generally the case, for the greater part of them procure their subsistence either by hunting or fishing, every domestic charge is devolved on the wife; still there are some who attend to agriculture and the rearing of cattle. Nothing can exceed the modesty which both the bride and bridegroom assume on the night they are wedded; and I have also been told that a separation frequently takes place a week or two after they are married, by reason of her desire to live four weeks in perfect continence. This, however, is not generally true, for I observed that chastity was very often violated among them before they are legally united."

Barrow, the author of "Travels in China," says: "The Mantchoo Tatars are scarcely distinguishable from the Chinese by external appearances; the Chinese are rather taller, and of a more slender and delicate frame than the Tatars, who are in general, short, thick and robust. The small eye, elliptical at the end next the nose, is a predominating feature in the cast of both the Chinese and Tatar countenances, and they have the same high cheek-bones and pointed chins. The native color, both of Chinese and Tatars seems to be that tint between a fair and a dark complexion, which we distinguish by the word brunet or brunette; and the shades of their complexion are deeper or lighter, according as they have been more or less exposed to the influence of climate."

Klaproth, and other writers, mention the fact that the Tungus, and especially the Tshapojirs, were wont to tattoo their faces after the prevailing Siberian fashion, with bars or straight lines on the cheek and forehead. In the matter of valour, the Tungus seems generally to have been the man of the receding area, save in China where the Mantchu is supreme. Adelung refers to the Mantchus of the Ssolan as a worthy and valiant people. All who have had to do with the Mantchu officials of China, civil or military, regard them as the *ne plus ultra* of falsehood and low cunning. Gutzlaff has characterized the Tungus tribes as deficient in valour; and Wood, in his "Uncivilized Races," describes them as good-natured but full of deceit. Yet Sauer gives an instance of the Tungusian's fidelity to his word. "An unchristened Tungoose went into one of the churches at Yakutsk, placed himself before the painting of Saint Nicholas, bowed very respectfully, and laid down a number of rich skins, consisting of black and red foxes, sables, squirrels,

etc., which he took out of a bag. On being asked why he did so, he replied, 'My brother, who is christened, was so ill that we expected his death. He called upon Saint Nicholas, but would have no sorcerer. I promised that if Saint Nicholas would let him live, I would give him what I caught in my first chase. My brother recovered, I obtained these skins, and there they are.' He then bowed again and retired." Sauer euphemistically deals with their begging propensities: "They frequently resort to the solitary habitations of the Cossacs appointed to the different stages, as they are there generally supplied with brandy, needles, thread, and such trifles as are requisite among them and their women, who always accompany them in their wanderings."

Turning now to the Dénés, we find Mackenzie saying: "The Chipewyans are sober, timorous, and vagrant, with a selfish disposition, which has sometimes created suspicions of their integrity. Their stature has nothing remarkable in it; but, though they are seldom corpulent, they are sometimes robust. Their complexion is swarthy, their features coarse, and their hair lank, but not always of a dingy black; nor have they universally the piercing eye which generally animates the Indian countenance. The women have a more agreeable aspect than the men, but their gait is awkward, which proceeds from their being accustomed, nine months in the year, to travel on snow shoes and drag sledges of a weight from two to four hundred pounds. They are very submissive to their husbands, who have, however, their fits of jealousy; and, for very trifling causes, treat them with such cruelty as sometimes to occasion their death. They are frequently objects of traffic, and the father possesses the right of disposing of his daughter. * * * Both sexes have blue or black bars, or from one to four straight lines, on their cheeks, or forehead, to distinguish the tribe to which they belong. These marks are either tattooed, or made by drawing a thread dipped in the necessary color, beneath the skin. * * * Plurality of wives is common among them, and the ceremony of marriage is of a very simple nature. The girls are betrothed at a very early period to those whom the parents think the best able to support them; nor is the inclination of the woman considered. Whenever a separation takes place, which sometimes happens, it depends entirely on the will and pleasure of the husband. * * * They are not remarkable for their activity as hunters, which is owing to the ease with which they snare deer and spear fish; and these occupations are not beyond the strength of their old men, women and boys; so that they participate in those laborious occupations, which among their neighbors are confined to the women. They make war on the Esquimaux, who cannot resist their superior

numbers, and put them to death, as it is a principle with them never to make prisoners. At the same time, they tamely submit to the Knisteneaux, (Crees), who are not so numerous as themselves, when they treat them as enemies."

"They do not affect that cold reserve at meeting, either among themselves or strangers, which is common with the Knisteneaux, but communicate mutually and at once, all the information of which they are possessed. Nor are they roused, like them, from an apparent torpor to a state of great activity. They are, consequently, more uniform in this respect, though they are of a very persevering disposition when their interest is concerned. * * * In their quarrels with each other they very rarely proceed to the greater degree of violence than is occasioned by blows, wrestling, and pulling of the hair, while their abusive language consists in applying the name of the most offensive animal to the object of their displeasure, and adding the term ugly, and *chiay* or stillborn. This name is also applicable to the fœtus of an animal, when killed, which is considered as one of the greatest delicacies. * * * The country which these people claim as their land has a very small quantity of earth, and produces little or no wood or herbage. Its chief vegetable substance is the moss on which the deer feed, and a kind of rock moss, which, in times of scarcity, preserves the lives of the natives. When boiled in water, it dissolves into a clammy, glutinous substance. that affords a very sufficient nourishment. * * * They are also of a querulous disposition, and are continually making complaints; which they express by a constant repetition of the word *eduiy*, "it is hard," in a whining and plaintive tone of voice."

My copy of Hearne's Voyage is a French translation, which will account for the variation of the extracts from the original. He says: "The Northern Indians are, in general, of medium stature, well proportioned, and strong; but they have little corpulence. They lack the activity and suppleness natural to the Indians whose tribes inhabit the western coast of Hudson's Bay. The color of their skin approaches that of dark copper. Their hair is black, thick and shiny, like that of other Indians. * * * The features of these Indians differ entirely from those of the other neighboring tribes, for their foreheads and eyes are small, their cheek bones high, and their nose aquiline, their face pretty full and their chin, as a rule, large. Their features vary but little in the individuals of the two sexes; but it might be said that nature has submitted to fewer abnormalities in the case of the women. These natives have an exceedingly soft and even skin, and when they

keep their clothes clean there is no people in the world that has less smell. All the Northern Indians, as well as those of the Copper River and the Cote de Chien, bear, on each cheek, from three to four parallel lines which they make with an awl or a needle inserted under the skin which they rub with powdered charcoal when the instrument is withdrawn. In general, the Northern Indians are very selfish; I really believe that they have no word in their language to express gratitude. They speak incessantly of their poverty, and, during the whole time of their stay at the fort, there is not one of them who does not complain of a thousand needs."

"Each of these Indians hastens to make known his misfortunes, real or imaginary, and takes care to accompany his recital with sighs and tears. There are some, even, who pretend to be lame or blind, the better to excite pity. I know of no people so thoroughly masters of themselves on such occasions, and, in that respect, the women are superior to the men; for, I can affirm having seen one, the one side of whose face expressed joy, while the other was bathed in tears. * * * Flattery is no less known to these Indians; they make use of it as long as interest prescribes it but no longer. * * * If, at the end of a certain time, this conduct of theirs does not produce the effect intended, they break forth into invectives. * * * For the rest, their rage is only temporary, and they soon become reconciled with the man whom they had intended to dupe. 'He is not a child,' they end by saying among themselves, 'therefore he can't be taken in.' * * * In spite of these bad qualities, the Northern Indians are still the most easily managed of all those who frequent the Company's stores. As they drink little liquor, they keep their senses, and confine their violence to conversation. These Indians are, in general, very jealous of their wives, and I do not doubt that the same is the case with them; but they are too much afraid of their husbands to dare exhibit the least suspicion. I cannot better compare the attitude of a Northern squaw before her husband than to that of European servants in the presence of their masters. The marriages of these people are accompanied with no ceremony. All the proposals and arrangements are made by the fathers and mothers or the nearest relations, and the women, under these circumstances, seem to be reduced to have no other will than that of their relations, who in their choice simply consult interest. * * * Divorce is very common among the Northern Indians. It arises often out of immorality, but more frequently still, from incompatibility of disposition or bad conduct When it takes place, the ceremony begins with a volley of blows from a stick which the husband applies to his wife, and ends with putting her

to the door, telling her to go and find her lover, if she has one, or, in the contrary case, her own family."

"The most remarkable dish of all the Indian tribes, whether of the north or of the south, is that composed of the blood and the half digested substances contained in the stomach of the cariboo, which they boil with a sufficient quantity of water to give it the consistency of broth. * * * Of all the larger animals, the cariboo is the only one the contents of the stomach of which the Indians who border on Hudson's Bay eat. They are so fond of it in winter, the time when this animal feeds on a tender white moss (lichen, *Ceenomyce rangiferina*), that I have seen them stop at the very spot where a deer had just been killed to devour the still palpitating entrails. They care less for this food in summer, if food it can be called, the moss then not possessing the same properties."

With these extracts from both hemispheres may be compared the more recent observations of one who has exercised keen insight during a period of ample opportunity, into the lives of the Déné tribes. Father Morice, in his papers contributed to the Institute, has the following statements, worthy, in this connection, of special consideration. "The American aboriginal type is too well known on this continent to require a description from me. Our Dénés, in spite of the characteristics which particularize them into various tribes, do not materially differ from it. Suffice it to say, that whilst the Chilxotins are generally of low stature, broad shouldered, and not unlike the Chinese in their physical features, the Carriers are, as a rule, rather tall and stout, without being corpulent, while most of them possess a fine physique. On the other hand, the Sekanais and Nah'anes, especially the former, are slender and bony, with hollow cheeks, and almond shaped eyes shining with ophidian brightness. Of course, tattooing prevailed everywhere. The face was particularly the object of would-be ornaments in the shape of incrusted crosses or birds on the cheeks, the forehead or the temples. But more commonly they consisted of parallel stripes, more or less numerous, on the chin or the cheeks, converging to the mouth corners. On exceptional cases, such as dances or 'potlatches,' the Dénés had recourse to charcoal to render themselves apparently more redoubtable. And the young folks had vermilion to enhance their natural beauty, and it may safely be conjectured that they did not use it sparingly." In the matter of painting, the Tungus custom was that of the Dénés, as will appear under the heads of Dress and Warfare.

Father Morice continues: "Washing may be said to be a European

custom introduced among them. They clean their hands only, which they wash by filling their mouths with water and then squirting it over them in intermittent streams." Now, the author's mind must have run partly in the direction of this paper, for he subjoins a note: "This reminds the comparative Sociologist of a similar custom prevailing among the Tartars or Moguls of the Middle Ages. William of Rubruck (St. Louis' envoy to the great Khan, 1253), says that, 'They never wash their clothes. Cleanliness is in no more favour with the men than with their ladies, and their mode of washing their faces and hands is by filling their mouths with water and squirting it over them." *Relation des Voyages en Tartarie, Bergeron.* Perhaps Chinese laundrymen, who sprinkle their washing in this fashion, obtained it from their rulers, the Mantchus.

"Considered in their social condition and daily pursuits, a portion of the Western Dénés are nomadic, and part may be described as semi-sedentary." I do not know that Father Morice anywhere refers to the Dénés' dislike of ancient smells, save in his "The Western Dénés; their manners and customs," where he says, "The Sekanais, owing to their dislike to fish, and their need of procuring fresh supplies of meat could never remain for any length of time at the same place." And again: "Even to this day they content themselves with circular coniferous branch huts or lodges, which they construct and abandon at a moment's notice, whenever their incessant peregrinations after food and peltries call therefor." In regard to moral character, Father Morice writes: "Making due allowance for their particular ideas of propriety, they are generally modest in deportment and chaste in privacy, despite the fact that several couples live together under the same roof and without partitions in the house. Should I have to sketch rapidly our Dénés' fmoral features, I think I could, by ignoring some necessary exceptions, give them credit for relative morality, great honesty, intense fondness for their offspring, and a general gentleness of disposition, not excluding, however, occasional freaks of irascibility. But to qualify their lives and give their true portrait, I should immediately add that they are prone to lying, addicted to gambling, naturally selfish, cowardly, and at times very lazy, especially the stronger sex." But, in his notes on the Western Dénés, the author says: "Our Western Dénés, who usually prove so cowardly against a human enemy, are so courageous when matched with almost any wild beast, that among them he would not be considered a man who would be afraid of a bear."

In the same notes he writes: "The Tse'kehne are slender and bony,

in stature rather below the average, with a narrow forehead, hollow cheeks, prominent cheek-bones, small eyes deeply sunk in their orbit, the upper lip very thin, and the lower somewhat protruding, the chin very small, and the nose straight. Go and inspect them, and, perhaps, out of every ten men, five who have long been fathers, will appear to you like mere children. I have never seen but one fat person among them, and none that was bald. Now, the Carriers are tall and stout, without, as a rule, being too corpulent. The men, especially, average 1m 660mm (about five feet five), in height. Their forehead is much broader than that of the Tsh'kehne, and less receding than is usual with American aborigines. Their face is full, with a nose generally aquiline, and in every case better formed than that of their heterogeneous neighbours ; their lips are thicker and their chin more prominent than those of the Tse'kehne. Their eyes are also much larger and of a very deep black. Baldness, though rare, is sometimes noticed among them, while a few are literally obese. I am very much mistaken, if two crania, one of an individual of each of these tribes, would not be pronounced by a craniologist as belonging to representatives of diametrically different races. The Tsilkohtin, on the other hand, are short in stature, broad faced and broad shouldered, with prominent cheek bones, heavy jaws, and a nose which is, not uncommonly, thick and flattish. They may be said to have some physical resemblance to the Chinese. This description applies also to the Babines, who might be considered as a branch of the Carriers. The only points in common between the three tribes are the dark eyes, the black, coarse, and straight hair, and the small hands and feet. Large hands and feet, however, are occasionally met with among Carrier men. I do not speak of the complexion, because it varies even in the same tribe, according to the occupation and food of the natives. A hunter will never return from a tour of two or three months in the woods without being considerably bronzed, while his fellow tribesman who has remained at home, without being as white as a European, will yet be fairer complexioned than most individuals of the Salish race in the South. Even in the matter of beard, a notable difference is observable, in as much as full beards, dark and coarse, heavy with hardly any shaving, are by no means rare among the Babine sub-tribe, while the rest of the Western Dénés are remarkable for the scarcity, or sometimes the total absence of facial hair."

"If we now consider the Déné nation from a psychological standpoint, the contrast between its divers branches will be still more startling. The Northern Dénés are generally pusillanimous, timid, and cowardly. Now can this be said of the Apaches? The Northern Dénés, are, moreover,

lazy, without skill or any artistic disposition. Is it so with the Navajos? Even among our Carriers, the proudest and most progressive of all the Western tribes, hardly any summer passes off but some party runs home panic stricken, and why? They have heard at some little distance, some 'men of the woods,' evidently animated by murderous designs, and have barely escaped with their lives. Thereupon great commotion and tumult in the camp. Immediately everybody is charitably warned not to venture alone in the forest, and after sunset every door is carefully locked against any possible intruder. Compare these puerile feats of the Carriers with the indomitable spirit, the warlike disposition of the 'terrible Apache.' Compare also, the rude, inartistic implements, the primitive industries of the same tribes, with the products of the Navajo ingenuity, their celebrated blankets and exquisite silverwork especially —and tell me if, in this case, psychology is a safe criterion of ethnologic certitude. A noteworthy quality of the Northern Dénés, especially of such as have remained untouched by modern civilization, is their great honesty. Among the Tse'kehne, a trader will sometimes go on a trapping expedition leaving his store unlocked without fear of any of its contents going amiss. Meanwhile, a native may call in his absence, help himself to as much powder and shot, or any other item, as he may need; but he will never fail to leave there an exact equivalent in furs. Now, compare this naive honesty with the moral code in vogue among the Apaches. Read also what is said of the Lipans, another offshoot of the Dené stock; they "live in the Santa Rosa mountains, from which they stroll about, making inroads in the vicinity to steal horses and cattle." While on this subject our author may be again quoted: "Intoxicating liquors unscrupulously proffered them have demoralized the unfortunate natives, while immoral relations between their women and the whites have engendered maladies previously unknown and which have deprived the former of that fecundity which was formerly their pride."

Martin Sauer has referred to the food of the Tungus in dried fish, berries, etc., and to the boxes on trees or poles in which they kept supplies of it. Father Morice says: "The staple food of the Western Dénés, before the introduction of civilization and its concomitants, may be described under three heads, fish, meat and berries, to which correspond the co-relative pursuits of fishing, hunting and collecting." He describes at length the curing of fish and the drying of berries, and, in his Notes on the Western Dénés, he furnishes an illustration of the *tsa-tcen* or provision store of the Carriers, in which "is stowed away the dried salmon, which is the daily bread of both Carrier and Tsilkohtin. He thus describes it: "It consists of two parallel frames planted upright

in the ground, the component parts of which are furnished in the middle with transversal beams, upon which rests the floor of the *tsa-tcen* proper. With the exception of the front end, the whole is made of heavy poles superposed one upon another or laid in close juxtaposition, as the case may be, and fastened to the frame of the building by means of *'ken* or high-cranberry bush wattle. The front end is entirely of boards. All the wall poles being laid with their larger ends in the same direction, a slight inclination results at the top, which constitutes the roof of the building. This is furthermore covered with spruce bark." This *tsa-tcen* is identical with the food-box of the Tungus, and differentiates the race on both continents from neighboring tribes who make *caches* in the ground.

In regard to marriage, Father Morice writes: "Marriage in the Christian sense of the term is rather a misnomer when intended to designate native unions such as were contracted before the advent of the Missionaries in the country. Co-habitation would better answer the purpose. In fact, it is the corresponding expression they employ themselves when referring to a man married to such and such a woman. They say, *yeroesta*, "he stays with her." For, as there was no valid contract, and no intention on either side to consider their union as a permanent connection, divorce resulted as a matter of course whenever one of the partners was tired of the other. * * * Among the Se'kanais nothing was simpler or more expeditious than the contraction of marriage. Whenever a young hunter had made up his mind on mating a fair child of the forest, with scarcely any previous courting, he would, in the day time, simply ask the girl of his choice: "*Will you pack my beaver-snares for me?*" To which, if she refused him, she would make answer: "No, there are plenty of women, ask another one." But, if agreeable to the maid, she would at once answer, without any conventional blushes: "Perhaps, ask my mother." Upon which, the lad would not ask her mother, but the girl would immediately tell her about it. Then, following her parent's advice, she would hasten to erect a branch lodge alongside their own primitive habitation, and, in the evening, the affianced youth (such was he after the proposee's answer), would, on entering it, hand her his "beaver snares." Without further ceremony they were man and wife. * * * The preliminaries, if not more complicated, were at least more difficult and tedious among the Carriers. According to their etiquette, the intended wife had absolutely nothing to say for or against the projected union. Whenever a youth of a different clan had singled her out to be his future wife, he would not exchange a word with her, even when proposing, but, installing himself

at her father's home, he would begin to work for him, not failing to present him or the girl's most influential relative with anything of value which might come into his possession, either by hunting or otherwise. Meantime, he would never tell them the reason of such unwonted liberality, neither would they ask him, but they easily guessed it. When, after one or two years' wooing to his intended wife's parents, he thought a well-deserved "yes" was likely to reward his efforts, he would demand her from her father or guardian, through the instrumentality of an obliging friend. If agreeable, the suitor was thereby married. If not, then the recipient of his favours was bound to return an equivalent in kind. * * * Polygamy flourished to a great extent among all of the tribes. The more exalted the man's rank, the more numerous would be his wives. * * * Nevertheless, there was always one, not necessarily the first in priority of co-habitation, who was regarded as superior to the others, whom she then called her younger sisters, receiving in return the title of elder sister from them. Even polyandria was in honor conjointly with polygamy among the Se'kanais; but remained unknown to the Carriers."

DRESS AND ORNAMENTS OF THE TUNGUS AND THE DÉNÉS.

Abernethy does not sufficiently distinguish between Siberian peoples, when he says: "The Tungusi, Coriaks, Kamschadales, and other tribes in the northeast parts of Asia are differently attired from what they were a century ago. Like every other rude nation in their original state, they covered themselves with furs and hides, like the shepherds of Spain and Italy, the upper garment consisting of one piece, with a hood and sleeves; it bears also some resemblance to the dress of Capuchin Monks, though not so long, for it reaches not further than the knee. From the knee downwards they are covered with leggins of deer or buffalo skin; their shoes, also, are made of the same. These robes were formerly dressed with the hair on, but the Tungusi, especially, and the Coriaks have made themselves so well acquainted with the art of tanning, that hair is not seen in any part of their dress, except the hood, the neck, and the cuffs of the sleeves of the upper garment. The tanned covering is generally painted with considerable taste. The figures represent those animals which have been chosen by each tribe as their distinguishing marks. In the summer season they wear a kind of petticoat round the waist which comes down to the knees; it is made of coarse linen or cotton, which they manufacture themselves. At this time they paint their bodies with a variety of colors. The process of thus adorning themselves consists in pricking those parts of the body which are not

covered, and rubbing them over with different colors. * * * The warriors paint their faces that they may appear more warlike. Others who are not engaged in hostilities, do the same, because, I suppose, they imagine they look more handsome. * * * They take great pains to dress their hair, which is generally long and oily, by reason of being smeared with grease. The pendants in their ears and nostrils are usually shells, which are painted on one side with a red, and on the other with a blue color; but they never consider themselves in their full uniform without a crown made of the plumage of a bird called the *rootoo*. Their women may be said to follow the same practices, although they pay very little attention to their hair."

Santini confines himself to the Tungus. "As to the dress of the Tungusi, like that of every barbarous nation, it is generally made of the skin of wild beasts. This dress is simply fitted to the form and shape of the body, or, it is adorned with various ornaments, according to the degree of civilization which these nations have arrived at. The Tungusi, in their orginal state of barbarity, were dressed in skins; they painted their bodies and faces with various colors; they bored their noses and ears, whence hung colored shells. For their head covering they had crowns made of the skin of a young deer, ornamented with the plumage of rare birds, especially the peacock. Every part of their dress was embellished with coloured porcupine quills; they had shoes particularly suited to the winter, in order to traverse the snowy plains more easily; their length was about two feet. From the lightness and structure of these shoes, they were able to perform long journeys. The soles consisted of a net made of strings of a raw hide. * * * I have always observed among the Tungusi, at least, among the greater number of the men, that, in their modern dress they wear two shirts, one next their skin, and the other over their waistcoat. I do not know the reason of this custom; nevertheless, some have told me that it originated from the motive of vanity."

Sauer's statement is brief. "Their tents are covered with shamoy, or the inner bark of the birch, which they render as pliable as leather by rolling it up and keeping it for some time in the steam of boiling water and smoke. Their winter dress is the skin of the deer, or wild sheep, dressed with the hair on; a breastpiece of the same which ties around the neck and reaches down to the waist, widening towards the bottom, and neatly ornamented with embroidery and beads: pantaloons of the same materials, which also furnish them with short stockings, and boots of the legs of reindeer with the hair outward; a fur cap and gloves. Their summer dress only differs in being simple leather without the hair." In

his account of the Yukagirs, he says: "Their dress is now the same as the Russians of these parts: it was formerly like that of the Tungoose, whose tailors they still remain, embroidering the ornamental parts of their clothing, for which they receive in return articles of dress, skins or furs." Again, in his illustration of a Tungus settlement, facing page 44, he represents a native clad with an inner garment of a light colour, descending like a petticoat, to the knee, and an outer one, much darker, like a sleeved but open overcoat, falling a trifle lower. The store-house represented is very similar to that pictured by Father Morice, and the huts are circular, with conical roof made of branches, rising from a low wall of stakes or boards.

Of the Dénés, on the other hand, Mackenzie writes: "There are no people more attentive to the comforts of their dress, or less anxious respecting its exterior appearance. In the winter it is composed of the skins of deer and their fawns, and dressed as fine as any chamois leather, in the hair. In the summer their apparel is the same, except that it is prepared without the hair. Their shoes and leggins are sewed together, the latter reaching upwards to the middle, and being supported by a belt, under which a small piece of leather is drawn to cover the private parts, the ends of which fall down both before and behind. In the shoes they put the hair of the moose or reindeer with additional pieces of leather, as socks. The shirt, or coat, when girded round the waist, reaches to the middle of the thigh, and the mittens are sewed to the sleeves, or are suspended by strings from the shoulders. A ruff or tippet surrounds the neck, and the skin of the head of the deer forms a curious kind of cap. A robe made of several deer or fawn skins sewed together covers the whole. This dress is worn single or double, but always in the winter, with the hair within and without. Thus arrayed, a Chipewyan will lay himself down on the ice in the middle of a lake, and repose in comfort. * * * The snowshoes are of very superior workmanship. The inner part of their frame is straight, and it is pointed at both ends, with that in front turned up. They are also laced with great neatness with thongs made of deer-skin." Hearne has little to say on the matter of dress, beyond mentioning the fact that the attire of the Northern Indians was made of Cariboo skin, ornamented with its hair, and thus a receptacle for vermin; he also describes their snowshoes as quite different from those of the Southern Indians or Crees.

Father Morice quotes the Rev. E. Petitot as follows: "Besides the blouse of white skin, with tail appendages, decorated with fringes and metallic trinkets, which was the primitive costume of the Déné-dindjiés,

and which the Loucheux still wear, the former, as well as the Hares, add to it trousers of the same material and as richly adorned, to which the foot-gear is sewed. It is worn by women as well as by men. The more southern tribes replace the trousers by thigh pieces fastened to the legs by garters, and by an oblong breech-clout of any kind of stuff. The woman's robe is very short and adorned with a profusion of fringes, tufts of wool, beads, and jingling trinkets. The common foot-dress is the moccasin, or shoe of soft skin, which imprisons and fits the foot as a glove does the hand. During the winter, the reindeer, the beaver, and the arctic hare are laid under contribution to furnish the inhabitant of the desert with clothes that are at once warm and light and convenient." This quotation is followed by a minute account of the various articles of Déné attire, for which, for brevity's sake, I substitute Father Morice's words in " TheWestern Dénés—Their Manners and Customs." "As for extraneous ornaments of every-day wear, they consisted mainly of *haliotis* earrings and nose pendants, often of enormous size, hanging from the perforated septum. These were common to both sexes. * * * In common with the Nazarenes of old, men and women parted their hair in the middle and wore it at full length (except when in mourning), the men letting it fall on their back, tied together in a knot when in repose, and rolled up like that of the Chinese when travelling, while women had it resting on the forepart of their shoulders in two skilfully plaited tresses, adorned with a species of small, elongated shell (*Dentalium Indianorum*), which was highly prized among the natives, and which they obtained from the coast Indians." Sauer says nothing of the Tungus' method of wearing the hair, but his picture, opposite page 320, of a woman of the Tchuktchis, near neighbours of the Tungus, represents her as wearing it exactly in the fashion here described, the two plaits hanging in front of her shoulders. To resume : " As for their wearing apparel, without being strictly uniform, it may be said that, in no case was it of a very complicated pattern. Besides the " pagne," or breech-cloth, which was seldom removed, they wore a sort of tunic or loose vestment of beaver, lynx, or marmot skin, with the fur next to the body. The outside was painted in variegated designs in vermilion, and adorned with numerous fringes to conceal the seams, and bands of dentalium or dyed porcupine quills. A pair of leggings reaching to the thigh, together with moccasins, which, in the case of the poor, were of salmon skin, completed their costume. Unlike their kinsmen of the Great Mackenzie Basin, they had no hood attached to their coat or tunic, but instead, wore a head-dress made of a small ground-hog skin, and fashioned somewhat like a Scotch bonnet. The women's wearing apparel differed only from that of the men by the length of their tunic,

which was ordinarily covered with a skin cloak or a woven rabbit skin robe falling to their feet."

WAR AND WARLIKE IMPLEMENTS OF THE TUNGUS AND THE DÉNÉS.

Mr. John McIntosh, author of "The Origin of the North American Indians," says: "When war is declared among the Tongusi, according to Abernethy, Santini, and others, the first ceremony, which is the same among the North American Indians, is *to hang the kettle on the fire*," Abernethy, speaking of warlike expeditions, says: "Some tribes among the Tungusi and Coriaks paint themselves black the day before they depart; this colour, however, is changed to red on setting off. * * * The Tungusi, in order to ascertain the courage, patience, and perseverance of their warriors, inflict many injuries and insults on the young people who never faced an enemy. They first reproach them with the names of cowards; they beat them with their clubs and even throw boiling water on them, and if they show on these occasions the least impatience and sensibility, they are reckoned as dastards who are not worthy of the name of warriors. They carry this practice of trying the young men so far that it would be too tedious to relate them. * * * When the day of departure is arrived, they are not at all void of those tender feelings which are always found among any civilized nation on occasions of this sort. They give mutual pledges as assurances of a perpetual remembrance. At their departure, the whole village meets at the cabin of the chief, which is now surrounded by warriors. On coming out of his cabin, he addresses them for the last time. After his speech, he again sings the song of death, and they all take their leave of their families, friends and relatives. * * * Their arms are bows and arrows, a javelin and a *head-breaker*. Their defensive armour consists of the hides of buffaloes, and sometimes a coat of pliable sticks, woven and pretty well wrought." Sauer has nothing to say of the Tungus in war, but states that they hunt with bows and arrows; but he has a picture facing page 321, of a Tchuktchi man in armour, to which he appends this note: "The armour is made either of lath-wood, with thin bone, or, if they can obtain them, iron hoops in preference; they are fastened together with the sinews of seals, so that they will bend both ways, and are covered over with leather which is bound on with thin slips of whalebone, which gives it the appearance of so many hoops. They are replete with loops and buttons, upon which they hang their bows, arrows, etc.; the upper part occasionally lets down." To return to Abernethy: "Innumerable ceremonies attend the entrance of the warriors into their villages on their return from the field of battle. The

Tungusi enter in great triumph. They send two messengers before to announce their approach and relate their success, if they come off conquerors. All their friends of both sexes are summoned to meet them, at some distance from the village, with provisions and other refreshments. Here they make a feast, during which everyone recounts his own exploits and heroic actions. After they amuse themselves with dancing and singing, they return home, where they are entertained with more sumptuous festivities which last for several days. The prisoners are contented with singing mournful airs, in which they implore the compassion of their conquerors. When captives are adopted among them, they fail not to show them that they are no less humane than they are ferocious when they inflict punishment."

Mackenzie describes the arms of the Slaves and Dogribs: "Their arms and weapons for hunting are bows and arrows, spears, daggers and pogamagans, or clubs. The bows are about five or six feet in length, and the strings are of sinews or raw skins. The arrows are two feet and a half long, including the barb, which is variously formed of bone, horn, flint, iron or copper, and are winged with three feathers. The pole of the spear is about six feet in length, and pointed, with a barbed bone of ten inches. With this weapon they strike the reindeer in the water. The daggers are flat and sharp pointed, about twelve inches long, and made of horn or bone. The pogamagan is made of the horn of the reindeer, the branches being all cut off except that which forms the extremity. This instrument is about two feet in length, and is employed to dispatch their enemies in battle, and such animals as they catch in snares placed for that purpose."

Hearne gives the details of an attack made by his Northern Indians upon a body of Eskimos. The expedition began by leaving the women and children and the baggage behind. "The separation then took place, but hardly were we on the march when they uttered lamentable cries, which were prolonged until the moment we lost sight of them. This heart-rending scene made so little impression upon the Indians who accompanied me, that they continued their march laughing, and I may even say that I never saw them more joyful." Several other Indians came to share in the glory of the expedition, concerning whom Hearne says: "Each of them, as well as my own Indians, had made shields for themselves before leaving the wood of Clowey. These shields, made of boards, were about three-quarters of an inch thick, two feet wide, and three feet long. They were intended to parry the arrows of the Esquimaux. * * * Arrived on the other side, each of my companions set himself to paint the face of his shield. Some depicted

the sun, others the moon, some birds and others beasts of prey. A large number painted imaginary beings, who, according to this poor people's belief, inhabited the elements, the earth, the sea, the air, etc. * * * I observed, as a singular fact, that my company, which seemed to have so far ignored all subordination, in this horrible circumstance exhibited the greatest uniformity of will and sentiment. Reunited among themselves for the same purpose, all the Indians were ready to follow Matonabbee wherever he wished to lead them. * * * Never in any assembly of men did private interest hasten more eagerly to make sacrifices for the public good than on this occasion, for, whatever an individual had in possession, he at once shared with him who was destitute of it. All that friendship, generosity, disinterestedness, could effect upon the heart of a Northern Indian was never developed so brilliantly. One would have said that there reigned in this people public spirit, a kind of national pride; and the barbarians meditated the most cowardly of crimes. * * * While we were in ambush, the Indians made their final preparation for battle. Some painted their faces black, others red, several a mixture of the two colours, and to hinder their hair falling over their eyes, they tied it in front, behind, at the sides, or cut it very short all round the head." When the massacre and pillage were ended "they betook themselves to the top of a neighbouring height, where, forming a circle, they sang several songs in honour of their victory, brandishing and clashing their spears. Often they interrupted the clangour to cry out *Tima? Tima?* in derision of the poor Esquimaux, who had taken refuge on a sand bank where the water was up to their knees." In Eskimo, *tima* is a friendly greeting. equivalent to: How do you do?

Father Morice enumerates the arms of the Western Dénés; their bows from four to five and a half feet long, their bone and flint arrow, dart, and spear heads, and their stone *casse têtes*. He also mentions their shields, "oval in form, like the Roman *clypeus*, and generally made of closely interwoven branches of amelanchier alnifolia. While on the warpath they also wore a kind of armour or cuirass consisting of dried sticks of the same kind of wood, arranged in parallel order and kept together with babiche lines interlaced in several places. This was common to the Haidahs and other coast Indians." The fact that this armour was found in Asia among the Tungus and the Tchuktchis, as attested by Abernethy and Sauer, proves that it was introduced to America by tribes of northern Asiatic derivation; yet, Washington Irving, in the twenty-second chapter of the second volume of his Astoria, mentions it as part of the defensive armament of the Tsinuks, and

Pickering, in the third chapter of his "Races of Man," assigns it to the Klamets or Lutuami of Oregon. Father Morice continues: "It would scarcely be proper to speak of war as an institution obtaining among the pre-historic Western Dénés. Although the various tribes despised and mistrusted each other, general fights were rare enough, and, as surprises constituted the main part of their system of warfare, it followed that success was, as a rule, on the side of the assailants. Sometimes the whole population of a village would be massacred in a single night. In that event, the victors would chant their hymn of victory, generally improvised on the spot and composed of the last words uttered by their victims. After their return from the fray, they would also repeat it dancing for several nights in succession. In no instance was scalping resorted to, at least, on this side of the Rockies." The wars of the Apaches and other southern tribes were more serious, but I possess no authentic details concerning them.

FUNERAL CUSTOMS OF THE TUNGUS AND THE DÉNÉS.

Abernethy remarks that, "the Tongusi evince a great deal of tenderness at the death of any of their family; their mourning sometimes lasts for a whole year. For several days they are commonly exposed on scaffolds within their cabins, and at other times near the place of interment. They bring them presents and food, which is consumed, they imagine, by their spirits." Mr. Macintosh quotes Santini and LaRoche as saying: "That the Tongusi and Coriaks mourn for the deceased for a considerable time and that the pits and graves where the dead are to be carried must first be fumigated or incensed, by burning, rosin or some dried aromatic herbs." He also quotes Santini to the effect "that it was customary among the Tongusi and Coriaks to bury along with the dead, everything that was dear to them while alive, especially their arms and family distinctions." Sauer's record is very brief. "They do not like to bury their dead, but place the body, dressed in its best apparel, in a strong box, and suspend it between two trees. The implements of the chase belonging to the deceased are buried under the box. Except a sorcerer is very near, no ceremony is observed; but, in his presence, they kill a deer, offer a part to the demons and eat the rest."

Of the Chepewyans Mackenzie says: "That they should not bury their dead in their own countrycannot be imputed to them as a custom arising from a savage insensibility, as they inhabit such high latitudes that the ground never thaws; but it is well known that, when they are in the woods, they cover their dead with trees. Besides, they manifest

no common respect to the memory of their departed friends, by a long period of mourning, cutting off their hair, and never making use of the property of the deceased. Nay, they frequently destroy or sacrifice their own, as a token of regret and sorrow." Hearne writes: "These people do not bury their dead. They abandon them in the place where they die, so that one must suspect they are eaten by wild animals and birds of prey. This is the reason why the Indians never eat the fox, the wolf, nor the crow, unless constrained by necessity. On the death of one of their near relatives, they strip themselves of their clothes and remain naked till someone comes to console them. The mourning for a father, a mother, a wife, a son, or a brother lasts a whole year. With the exception of shorn hair, nothing indicates this mourning in the costume of the Northern Indians. It consists solely in uttering cries almost incessant. Apart from time devoted to sleep and eating, whether they walk or rest, they emit at intervals a prolonged howl, which is often repeated in unison by all persons present."

Dr. Yarrow, in his "Introduction to the Study of Mortuary Customs among the North American Indians," says: "Tree burial was not uncommon among the nations of antiquity, for the Colchians enveloped their dead in sacks of skin and hung them to trees; the ancient Tartars and Scythians did the same." What he says regarding the Colchians is taken from Arrian, De Var. Hist. IV. 1, but I have a very distinct recollection of coming across similar facts in classical authors which I have not succeeded in verifying. It is unfortunate that Dr. Yarrow or his informant does not mention his authorities. However, I quote Dr. Yarrow at page 75 for the following: "W. L. Hardisty gives a curious example of log-burial in trees, relating to the Loucheux of British America. 'They inclose the body in a neatly-hollowed piece of wood, and secure it to two or more trees, about six feet from the ground. A log about eight feet long is first split in two, and each of the parts carefully hollowed out to the required size. The body is then inclosed and the two pieces well lashed together, preparatory to being finally secured, as before stated, to the trees.'" Mr. Dall, in his "Distribution and Nomenclature of the Native tribes of Alaska, etc.," has the following notes on Tinneh tribes: "*Unakhotana*—the bodies of the dead are always placed by them above ground in a box or wooden receptacle. *Kutcha-Kutchin*—They formerly burned their dead. *Tehanin-Kutchin*—They bury their dead in boxes above ground on which they pile up stones."

Father Morice's account is fuller than the preceding, and will be found in his paper, "The Western Dénés—their Manners and Customs." It sets forth the wailings of the relatives for a deceased man of note, the

announcement of his death to all concerned by young men of another clan who were rewarded for their pains, the singing and dancing of a mercenary alien clansman, to the assembled mourners, meeting for several nights. The remains were then provisionally placed under a bark roof-like shelter, near which the widow and children dwelt in a small hut of similar form. For two or three years the widow was the slave of her husband's relations, and bewailed him. Then his chief representative, having acquired much property, was prepared for the cremation of what remained of the corpse. In view of a large assembly the funeral pile was kindled, and attempts were made to burn the widow, after which the property was given away in a potlatch. This was the Carrier custom, but among the Sékanais it was different. "Supposing the deceased was an influential person, dear to the band, they would hollow a kind of coffin out of a large spruce tree, and suspend his remains therein on the forks formed by the branches of two contiguous trees. Some instances are also recounted in which the remains of such persons were closed up in a standing position in the hollow trunk of a large tree while in its natural state. The lid or door of these primitive coffins was usually formed of a split piece of wood, which, when strongly laced with long switches of red willow, held it to the trunk of the tree in its original shape."

PECULIAR ARTS OF THE TUNGUS AND THE DÉNÉS.

It has already appeared that the Tungus and the Dénés equally made use of porcupine quills and beads, or, in default of the latter, tubular shells, such as the dentalium, in the ornamentation of their dress. The snowshoe was common to both. This contrivance is, at least, as old as the Christian era, for Strabo found it in the Caucasus. "The heights are impassable in winter; in summer they are ascended by fastening on the feet shoes as wide as drums, made of raw hide, and furnished with spikes on account of the snow and ice." The toboggan, or sledge, was also a Tungus vehicle drawn by horses and reindeer, but more frequently by dogs, and not seldom by men or women. The Russians classified the Tungus in relation to it, as Horse, Reindeer, Dog, and Foot-going Tungus. This toboggan was called by the different tribes *natar*, *tolyoki*, *tolgoki*, *turki*, *sherche*, and *fara*. By a strange perversity, none of my vocabularies contain the Déné word for toboggan, and Father Morice, in his Notes on the Western Dénés, has nothing to say regarding it. Mackenzie, referring to the Chepewyans, as he calls them, remarks: "The sledges are formed of thin slips of board turned up also in front, and are highly polished with crooked

knives, in order to slide along with facility. Close-grained wood is, on that account, the best; but theirs are made of the red or swamp spruce-fir tree."

Hearne writes: "In winter, the Northern Indians tie together skins of cariboo legs, which, in this condition, present the form of long portmanteaus. Stripped of their hair by being dragged over the snow, they become smooth as kid, and serve to transport the baggage of the Indians when they traverse the barren lands; but, in the first wood they meet, they make genuine sledges with planks of spruce. These sledges are of different sizes according to the strength of the persons meant to draw them. I have seen some that were no less than from twelve to fourteen feet long by fifteen to twenty inches broad; but, generally, they are from eight to nine feet long and from twelve to fourteen inches wide. The boards of which they are made are not more than a quarter of an inch thick, and their width rarely exceeds five or six inches. Larger dimensions would not suit the implements of these Indians, which consist of ordinary knives, a little turned at the point, whence the Northern Indians give them the name *base-hoth*, and the Southern *mo-co-toggan*. These boards are bound to each other by parchment bands of cariboo skin, and crossed above by several bars of wood which serve to strengthen the sledge, and, at the same time, keep the baggage in place, which is fastened to them by smaller leathern thongs. The front of the sledge forms a semi-circle of from, at least, fifteen to twenty inches in diameter. This kind of front has for its object to hinder the sledge sinking in the snow, and, at the same time, to break down the hillocks produced by it on the plains and barren lands. The traces of these vehicles consist of a band of leather, the two ends of which are united and tied firmly together. The person charged with the drawing of the sledge passes it round his shoulders so that it adheres to his breast. Simple as this harness may be, I defy all the saddlers in the world to make a better." Finally, Father Morice says: "Another mode of travelling, proper to the cold season, is by means of light toboggans or sleds drawn by three or four dogs, trotting along in Indian file. These animals (which are now of different breeds), are very serviceable to the natives; for, even during the summer, when families are en route for their hunting grounds, their canine companions are compelled to assist the women in packing part of their master's baggage, firmly secured with lines to their sides."

The Tungus make extensive use of birch bark for covering their houses, for making various kinds of vessels, and for enwrapping the bodies of their dead. They also employ it in the manufacture of canoes

Mr. McIntosh quotes Pennant as saying: "The Tongusi use canoes made of birch bark distended over ribs of wood, and nicely sewed together. The Canadian and many other American nations use no other sort of boats. The paddles of the Tongusi are broad at each end; those of the people near Cook's River and of Onslascha are of the same form." We know that Pennant is right, for the Tungus have a special name for the birch bark canoe which they call *djalban-dyau*, the first word denoting the birch tree.

Mackenzie thus describes the canoes of the Dogribs: "Their canoes are small, pointed at both ends, flat-bottomed, and covered in the fore part. They are made of the bark of the birch-tree and fir-wood, but of so slight a construction that the man whom one of these light vessels bears on the water, can, in return, carry it overland without any difficulty. It is very seldom that more than one person embarks in them, nor are they capable of receiving more than two. The paddles are six feet long, one-half of which is occupied by a blade of about eight inches wide." Hearne's description is as follows: "The canoes of the Northern Indians are in form somewhat like a weaver's shuttle, having flat bottoms, straight sides and pointed end. The stern is always much larger than the bow, as generally intended to hold baggage and sometimes to be occupied by a second person, stretched at full length in the bottom of the canoe. The man and the baggage cross rivers and the narrower parts of lakes by means of these little crafts, which rarely exceed from twelve to thirteen feet in length and from twenty inches to two feet in their greatest beam. The bow of these canoes is elongated and narrow; it is covered with birch-bark which adds considerably to the weight without adding anything to its usefulness. Generally the Northern Indians make use of a single paddle, though some have a second, like the Esquimaux; but the latter is rarely employed, save to club cariboo when crossing rivers or narrow lakes." Father Morice says of the Carriers: "They use 'dug-out' canoes made of the hollowed out trunk of a large cotton-wood tree (*Abies subalpina*). There is no artistic merit in their design, which is of rather a rough description, for we must not forget that 'dug-outs' are, among them, a recent importation from the East. In the beginning of this century they used only birch bark canoes."

RITES AND CEREMONIES OF THE TUNGUS AND THE DÉNÉS.

Abernethy states that "The Tongusi believe in the existence of a supreme being, according to whose will they shall either conquer or die. They call him the *god of hosts*, because on him, they

imagine, the fate of their warlike expeditions depends. They worship likewise an *infernal Demon*, whose attributes are wrath and vengeance; while they invoke him, they are influenced solely by fear, lest he may afflict or torment them, for they believe that from him all their calamities and misfortunes proceed. As to a future state, they are as charitable as the *Universalist*, for they cannot bear to hear of a future state of torment and damnation. On the other hand, they imagine that they are to enjoy all the pleasures after which they aspired in this world. They have their priests, prophets and physicians; and their sacrifices consist generally of those brute animals which they consider the greatest favourites of the evil spirit, for they seldom supplicate the *Great Spirit*, except before battle, as they deem him a benevolent Deity, who is disposed to favour, rather than torment them.

* * * By offering sacrifices to the malevolent spirit, for it is seldom that they worship the benevolent *deity*, they think that they can avert his wrath. I have often observed that the Tongusi, of all the other tribes of Siberia, are those who pay the greatest attention to this religious ceremony; for, whenever they labour under diseases or scarcity of food, they first offer a sacrifice and then set out to hunt, fully convinced of their success. Their mode of offering sacrifices is attended with many ceremonies which are performed by their bravest warriors. Having lighted a fire, they take a dog, and sometimes a bear, which they suspend above the fire by several poles, till the animal is totally consumed. It is customary among some Tongusian tribes to dance during the sacrifice; there are others, however, who stand silent and motionless till the offering is completed. Then a dance commences which lasts for several hours, as if rejoicing for appeasing the angry *demon*. Before they go to battle they never fail to make an offering. Then all their villages are assembled and they form a kind of procession. The women walk one after another till they arrive at the spot where the sacrifice is to be offered. This place is generally some elevated ground at some distance from the village. The warriors march in full uniform with their faces painted. Before the *dog* is committed to the flames, they whisper something in his ear, telling him, as I have been told, to obtain for them the assistance of the *great* or *benevolent* spirit in battle, and prevent the *evil* or *mischievous* one from punishing them."

"On the night previous to their departure a very singular entertainment is given by the chief, in which the *Potoosi*, or the *sacred pipe*, is introduced, for the purpose of binding the warriors to fidelity and bravery. The Potoosi, among all the Tongusian tribes, is considered a sacred instrument, which their fathers received from the *Great Spirit* or

God of War, to make vows by fuming tobacco. On the evening therefore, before they depart, the warriors are summoned to appear before the chief in their martial uniforms. The women also attend, and they are attired in their richest robes. Having formed a circle, the musicians stand in the midst. Their music is very simple, for it consists only of two instruments, which produce neither harmony nor order. The dancers, however, keep time to the cadence of the music. This dance, as usual, was a ring or circle in which they moved roundwards incessantly, till it was announced to seat themselves on the ground to partake of the feast, the principal dish of which consists of the flesh of a *white dog*. Before the dog is put into the *kettle* they perform several ceremonies in offering him while alive to the *Great Spirit*; for they imagine that no animal is more pleasing, in a sacrifice, than a white dog. All their feasts are supplied with the flesh of the dog, and they might as well be called *sacrifices* as *feasts*; because the offering of the dog to their Supreme Deity always precedes the feast. After the dogs are consumed they rise and renew their dances. The first thing, however, after the feast, is the offering of the *Potoosi* to the *Great Spirit* by the senior chief. The fumes of the pipe are directed upwards towards the Great Spirit. This ceremony resembles, in a great measure, the Asiatic offering of *incense*. When the Chief imagines that the *Deity* is fully satisfied with this act of adoration, every warrior in his turn takes the pipe, which is decorated with various ornaments, and, at every *quiff*, promises to adhere to his commander, and never fly from his enemy. At the same time he relates what he has done in favour of his nation, and he foretells his future achievements. The Chief takes the *Potoosi* a second time, and, at every quiff, he enumerates the various engagements in which he conquered his enemies. The whole assembly then join in applauding his bravery and undaunted spirit. The feast of the Potoosi is concluded with the *song of death*, in which they swear vengeance against their enemies. Then they retire to their cabins or huts, to prepare for their departure on the following morning."

Mr. McIntosh, referring to the festivals of dreams, which he compares to the ancient Saturnalia and modern Carnivals, remarks: "According to Abernethy, they paint and disguise themselves when they go abroad, without paying any respect either to morality or decency. Many of them, especially among the Tongusi, says the same author, consider this a favourable opportunity of revenging insults and injuries, because they imagine that they are not known to the sufferer. * * * Abernethy speaks of his having disguised himself on one of these occasions among the Coriaks for the sole purpose, as he himself tells us, of saving his life;

because he considered them actually deranged, and consequently his life in danger on account of being a stranger and a foreigner. Santini found himself in the same predicament among some tribes of the Tongusi, and would most likely have been grossly insulted, had not his converts, the Tongusian princes, interfered in his behalf."

Gambling is not a ceremony, but it may be considered here, being unworthy of a special treatment. Mr. Mcintosh says: "The game of the Patooni, which LaRoche briefly describes, was, from every appearance, originally the same as that of the *little bones* among the American Indians, although in Kamschatka sticks were substituted for bones." "It is surprising," says LaRoche "to witness the simplicity and superstition of some of these people while they play some games. Before they set out to hunt they frequently form a party to play the *Patooni*, which consists in throwing up in the air small sticks about the size of an orange, with four sides, and resembling the dice of the Europeans, because each side has a certain number. He who has the greatest number upwards when they fall to the ground, is conqueror, and expects to be the most successful in the chase. It is considered, therefore, to be a great favour to belong to the winner's party when they separate themselves into different companies, because they imagine that they cannot be utterly disappointed while they are the associates of him who is to kill the most." Abernethy observed this and other frivolous games, which he did not deem worthy of any notice. Santini, in speaking of a certain game, which he does not describe, says that the Tongusi, when they played, resembled madmen more than rational beings, from the way in which their feelings were excited.

In regard to the rites of the Déné-Dindjiés, Father Petitot says: "It is not easy for any European to discover the customs and ceremonies of this people, because they surround them with mystery and distrust strangers. A long stay among the Indians, and the confidence of the old men, from whom I derive knowledge of the Déné traditions and of a considerable part of their customs, have alone enabled me to make the discovery." This discovery amounts to the fact that the Dénés have a mythology with its gods and devils, that they believe in the immortality of the soul, and that, in lieu of priests, they have jugglers or medicine men, who practice confession, fasts and songs which are called incantations, and to whom they attribute the power of recalling spirits to earth. He also states that the Déné-Dindjiés abhor the dog and never eat its flesh. In his other particulars there is such an evident straining after Hebrew analogies as to make them doubtful guides.

Hearne represents the dog as the father of the Northern Indian race and of all creatures. Then he says: "The Indians have no religion, and though their sorcerers, by songs and long discourses, conjure beasts of prey as well as imaginary beings, by which they pretend to be helped in the cure of diseases, they are as deficient as their credulous compatriots of any religious system." He tells how his Indians had been rendered ceremonially unclean by killing the Eskimo, which condemned them to abstinence of many kinds. "When the time to put an end to these ceremonies arrived, the men, having carefully removed the women, lighted a fire at some distance from their tents and threw into it all their ornaments, their pipes and their eating utensils, which were soon reduced to ashes. They then prepared a feast, composed of everything that had been denied them during their time of expiation, and, when it was ready, they were all free to eat, drink, smoke and embrace their wives and children at will."

Mackenzie gives the story of creation somewhat differently, making the large bird, which, according to Hearne, produced all creatures from the fragments of the primitive dog, to call forth "all the variety of animals from the earth, except the Chipewyans, who were produced from a dog; and this circumstance occasions their aversion to the flesh of that animal as well as the people who eat it." The same author says: "They are superstitious in the extreme, and almost every action of their lives, however trivial, is more or less influenced by some whimsical notion. I never observed that they had any particular form of religious worship; but, as they believe in a good and evil spirit, and a state of future rewards and punishments, they cannot be devoid of religious impressions. At the same time, they manifest a decided unwillingness to make any communications on the subject. * * * They believe that, immediately after their death, they pass into another world, where they arrive at a large river on which they embark in a stone canoe, and that a gentle current bears them on to an extensive lake, in the centre of which is a most beautiful island; and that, in the view of this delightful abode, they receive that judgment for their conduct during life which terminates their final state and unalterable allotment. If their good actions are declared to predominate, they are landed upon the island, where there is to be no end to their happiness; which, however, according to their notions, consists in an eternal enjoyment of sensual pleasure and carnal gratification. But, if their bad actions weigh down the balance, the stone canoe sinks at once, and leaves them up to their chins in the water, to behold and regret the reward enjoyed by the good, and eternally struggling, but with unavail-

ing endeavours, to reach the blissful island, from which they are excluded forever."

Our author, in another place, thus refers to the dances of the Slaves and Dogribs: "During our short stay with these people they amused us with dancing, which they accompanied with their voices, but neither their song or their dance possessed much variety. The men and women formed a promiscuous ring. The former have a bone dagger or piece of stick between the fingers of the right hand, which they keep extended above the head in continual motion; the left they seldom raise so high, but work it backwards and forwards in an horizontal direction; while they leap about and throw themselves into various antic postures, to the measure of their music, always bringing their heels close to each other at every pause. The men occasionally howl in imitation of some animal and he who continues this violent exercise for the longest period appears to be considered as the best performer. The women suffer their arms to hang as without the power of motion." Finally, Mackenzie treats of the game of the Platter as played by the Beaver and Rocky Mountain Indians: "The instruments of it consist of a platter, or dish, made of wood or bark, and six round, or square, but flat pieces of metal, wood, or stone, whose sides or surfaces are of different colours. These are put into the dish, and, after being for some time shaken together, are thrown into the air and received again into the dish with considerable dexterity, when, by the number that are turned up of the same mark or colour, the game is regulated. If there should be equal numbers, the throw is not reckoned; if two or four the platter changes hands. * * * They carry their love of gaming to excess; they will pursue it for a succession of days and nights, and no apprehension of ruin nor influence of domestic affection will restrain them from the indulgence of it."

After the mention of certain feasts and dances, Father Morice adds: "Another observance, formerly in vogue among the Carriers, was the *the'-tsoelrwoes* (precipitate exit). This was analogous in character to, if not identical with, a practice of which we read as having existed among certain European and Asiatic nations, the *Lycanthropia* of the ancients, the *Loupgarou*, of France, the Persian *Ghoule*, the Teutonic *Wehr-wolf:* all, probably, the result of a simulated ecstasy of superstitious origin. In the case in question and on the occasion of a large gathering of aborigines, a band of men would suddenly run out of a lodge, and, simulating madness, would, amidst wild yells and incoherent songs, make frantic efforts to bite the passers-by, or, failing in this they would seize upon a dog and devour him on the spot. * * * Apart from the superstitious dances of which mention has been made in the preceding

paragraph, the Western Dénés observed no religious ceremonies. They made no sacrifices, worshipped no deity, and had no definite *cultus*, unless we dignify with that name the Shamanism of the Northern Asiatic races which obtained among them. True, they vaguely believed in a kind of impersonal and undefined Divinity, not quite pantheistic, but rather more so than individual, almost co-essential with the celestial forces, the cause efficient of rain and snow, winds and other firmamental phenomena. They called it *Yuttoere* (that which is on high), in Carrier. But they did not worship this power—they rather feared it and endeavoured to get out of its reach, or, when this was impossible, to propitiate it and the spirits who were supposed to obey it, with the help and through the incantations of the *nelhgen* or conjurer. This shaman was credited, when exercising his mysterious art, with the power of controlling the coming or departing of evil spirits. Even when not actually conjuring, he was believed to be able to kill by his mere will any objectionable person. His services were called into requisition in time of famine, to prevent tempests, procure favourable winds, hasten the arrival of salmon and ensure its abundance, but, more generally, in case of sickness, which they believed to be concrete (not unlike the microbes of modern chemists), and always due to the presence or ill-will of spirits." Elsewhere Father Morice says: "We find that the Navajos and Apaches still hold to their superstitious beliefs and ceremonies, and keep themselves aloof of any civilizing influence."

The mythology, rites and ceremonies of the Apaches and Navajos are very elaborate. Some of them are treated in the Fifth and Eighth Annual Reports of the United States Bureau of Ethnology, by Dr. Washington Matthews and Mr. James Stevenson. These tribes had altars and sacrifices, but whether they sacrificed white dogs, as formerly did the Dakotas, I have no present means of knowing. The eating of a live dog by the Carriers in their lycanthropy looks like the degradation of an original rite connected with the animal, and the almost universal tradition that derives the Dénés from a canine ancestor is too remarkable to pass over. In his Three Carrier Myths, Father Morice gives three such traditional stories, one of which is embalmed in the Dogrib name. One of the Tungusi tribes was called "Indachun takurara Golo," the region where dogs are kept. In a paper contributed to the Royal Society of Canada, Father Morice has illustrated the propensity of the Dénés to borrow foreign customs, and thus almost necessarily to lose their own. It is, therefore, hardly begging the question to ask whether the white dog sacrifice of the Tungus may not have been one of the Déné rites that have fallen into desuetude in the course of years.

THE LANGUAGE OF THE TUNGUS AND THE DÉNÉS.

An instance of the strange over lookingof things that lies immediately at one's hand is the conduct of Mr. Lucien Adam, of Nancy, who, the author of a Mantchu grammar and the analyzer of that of the Western Montagnais, failed to perceive the intimate relation of the two grammatical systems. The Tungus and the Déné exhibit the chief peculiarity of Northern Turanian languages, that is to say, they are postpositional, and place the genitive and accusative before their regimen. In these respects they agree with the Japo-Siberian tongues of Asia, and the Dakotan, Iroquoian, Muskhogean, and the American families of speech which I have classified as Khitan. But they are differentiated from the Khitan languages by marked peculiarities. Father Morice calls attention to the monosyllabic roots of Déné substantives, as Adelung and Vater did long ago in the case of the Mantchu. The former says: "A third process of a different nature, change of meaning by intonation or vocal inflection, obtains also among some—not all—of the Déné tribes. Some of these intonations are even proper to fractions of tribes only. Thus *ya*, which means 'sky,' in almost all the dialects, becomes 'louse' to a Southern Carrier when pronounced in a higher tone." Adelung has many illustrations of this supposed Chinese peculiarity in Mantchu, as when he says, "*Bi*, for instance, means I, to be, to have, to leave; *be*, we, to take, birds' food, uncle, axle, and handle." But he adds, "whether these different meanings are distinguished by the tone, I do not know." The two groups agree in the absence of the article in each, and in that of true gender, and the substitution for it of a distinction between names as intelligent or unintelligent, noble or ignoble, animate or inanimate; also, in the formation of the plural by affixing an adverb of quantity. The genitive is expressed in each by adding to the name of the possessor that of the thing possessed, preceded by the third personal pronoun. The incorporation of pronouns and postpositions marks equally the Asiatic and the American families compared. There is the closest affinity between the Tungus and the Déné languages in regard to the inumerable modifications of the verb and substantive to express variety and quality of action and being found in each. Both groups agree in prefixing the pronoun to the verb, thus differing from the Ugrian and Turkish order of pronominal affixes. So far as grammatical structure is concerned, it may safely be said that the Déné dialects are not Japo-Siberian, Mongolic nor Turkic, but Tungusic. Even their

polysynthesis is not that of the Koriak-Tchuktchi of Siberia nor of the American Iroquois, which is the same, but of the Tungus.

I append a list of over 170 words, comprising different parts of speech in the two languages. For the Tungus, I am indebted almost entirely to Klaproth's Asia Polyglotta. The Déné I have taken from a great variety of sources, including vocabularies of tribes from the Eskimo border on the north, to Mexico in the South. These I have copied in good faith, though, it is quite possible, they may contain erroneous equivalents of the English terms. I regret the deficiency of my vocabularies in particles, especially postpositions. The numerals on comparison show strange discrepancy, either indicating that those of the Dénés belong to an archaic Siberian system, or that, prior to their advent to this continent, they had borrowed from the Kamtchadale Koriaks. It is strange that their 3 and 4 should be the same as the Tungus 4 and 5. Father Morice has questioned the native origin of Déné government by *toeńaz-as*, notables or chiefs; but it is certain that the Tungus recognized the distinction between such and the common people, and the Tungusic forms for lord and master, such as *edshen*, *hunniu*, *ungiu*, *nyunga*, and even *turunbayo*, suggest the original of *toeneza*. He has also stated that pipes and tobacco were unknown to the Carriers and Tsé'kéhne before the arrival of Sir Alexander Mackenzie. It is, therefore, strange to find the Orotong Tungus word for tobacco-pipe, *tagon*, so near in form to the Déné *tekatsi*. There is little doubt that the pipe was originally a sacred instrument or incense burner, and as such is prehistoric in many lands, independent of tobacco.

A dialectic difference of the Déné as compared with the Tungusic forms of speech is the replacement of labials, including m, and of r, by other sounds. So far as labials are concerned, the same is true of the Iroquois dialects as compared with their Asiatic relatives. This evidence of phonetic decay marks an unliterary language in transition through changed circumstances, in which climate, no doubt, played a large part There appears, also, that interchange of liquids which is so common a feature in northern Asiatic and American dialects, as in the Tungus *halgar* and *halgan*, foot; and even of less accountable variations, as in the forms for grass, *orokto*, *owokto*, *okokto*. A common Tungus term for the throat is *bilga*, but the Tshapogirs call it *nemgot*, both being derived from the same original root. Almost as great variations appear among Tungus words, as compared among the Asiatic dialects, as between them and those of the Déné forms of speech. It would be no matter for surprise to find the Déné *kliuthchu*, bread, in a comparative

vocabulary of the Tungus dialects, alongside the native *kiltora*; or *tiljkan*, day, with *tirgani*; or *hamiltu*, to give, with *omuli*; or *antonger*, to go, with *genigar*; or *dellin*, green, with *tshurin*; or *tulkun*, red, with *fulachun*. Some words in the two groups are quite irreconcilable, the result, in some cases, of borrowing, on the part of the Tungus from the Mongols and Koriaks, and on that of the Dénés from surrounding American tribes, although their dialects exhibit distinct traces of Koriak influence in an Asiatic habitat. The argument for the original unity of the Dénés and the Tungus is as convincing as that which joins the Indo-Europeans or Aryans in one family.

THE OTHOMIS OF MEXICO THE MOST ANCIENT TUNGUSIAN COLONISTS OF AMERICA.

The identification of the Dénés with the Tungusic stock has led to an important discovery, to wit, that the Othomis, supposed to be one of the oldest peoples of Mexico, are of the same family. Anthropologists have long called attention to their almost monosyllabic speech, and have compared it with the Chinese. In a few features of grammar and vocabulary the Othomi exhibits traces of Huastec-Maya-Quiche influence, but in very few. I subjoin a comparative vocabulary of over a hundred and fifty words of different syntactical value, in which the Othomi is placed opposite Tungus and Déné equivalents, to its complete identification with these tongues. In the Othomi, therefore, we have the simplest and oldest extant form of Tungusic speech, as its primitive forms plainly indicate, and, at the same time, the language employed by Attila and his Huns in the middle of the fifth century. In one of the dated tablets from the Mounds, which I had the honour to submit to the Institute in December, 1894, that namely of Davenport, Iowa, the first authentic American record of the Othomis is found. It relates that Maka-Wala, or Wala-Maka, for both forms are given, was king of Atempa, and that he was overthrown in battle by Mashima, king of Tolaka, in 793 A.D. Now, the capital of the Othomis in Mexico was Otompan, and its American prototype was Atempa or Otempa, at present Ottumwa in Iowa. Otomo, or Odomo, was the name of a Japanese clan, the chiefs of which are conspicuous in the annals of the empire, some of them being at times found in revolt and punished with expatriation. The course of the Iowa moundbuilders must, judging by the purity of their Japanese record, have been from the Japanese Islands by sea to British Columbia, and thence to the Saskatchewan. This journey they might easily have accomplished within the century, so that

the advent of the Othomis, or the vanguard of the Tungus, to America may be placed about the year 700 A.D.

Malte-Brun says: "The Othomi, or Hiâ-Hiû, is one of the most widely spread languages of the Mexican republic, since it is spoken in all the State of Queretaro, and in part of those of San Luis de Guanaxuato, Michoacan, Mexico, Puebla, Vera-Cruz, and Tlaxcala. According to Clavijero, the country of the Othomis began in the northern part of the valley of Mexico, and extended as far as the mountains, which are about ninety miles from the capital. Among inhabited regions which were numerous is to be remarked the ancient and celebrated city of Tula, founded by the Toltecs, and that of Xilotepec, which, since the Spanish Conquest, became the Othomi metropolis. This nation is regarded as one of the most ancient in Anahuac; having retained its savage state during several centuries, it had the reputation of being the rudest of those of the land. The Othomis, says Father Sahagun, were naturally heavy, rude, and unskilful, and so celebrated for indolence, that it was customary to say instead of 'Ah! the clumsy fellow!'—'He is like an Othomi.'" It was only towards the fifteenth century that the Othomis began to live in society, as subjects of the kings of Tezcoco; they then founded several villages. A large number of those who had persevered in their savage ways gave much trouble to the Spaniards before they were subdued; this did not take place until towards the seventeenth century.

The Abbé Brasseur de Bourbourg writes: "There is reason to believe that the Othomis occupied the mountains and valleys of Anahuac a considerable time before the Nahoas and the tribes afterwards known by the name of Toltecs. Rude and barbarous in their persons as in their customs and language, leading a hard life, preferring the mountains to the plains, the Othomis have preserved, since the farthest removed period of Toltec tradition, the same manners and the same idiom, without ever becoming absorbed in the nations settled beside them, who persecuted them more than once, and have themselves passed away without leaving a trace behind. Their language, rough as themselves, is monosyllabic, embracing every kind of sound, but destitute of grace, exhibiting, nevertheless, in its simplicity something majestic that savours of antiquity. It calls itself 'Hiang-Hiung,' that is to say, the language that endures and is permanent, and the name 'Othomi' which those who speak it bear, expresses in a touching way, their condition of dependence and misery in the course of many ages 'never quiet.' Whence came the Othomi? Through what countries did they pass before descending to Mexico? What is this language

so different from others to which they give the name of the permanent hiang-hiung? All that is known to-day is that they preceded the Toltecs, and that they not only inhabited the province of Tula before the foundation of the kingdom of that name, but also a considerable portion of the regions of the Aztec table-land. Though rude and barbarous now, they are far from the state of mere savages, which seems never to have been their condition. Harsh mountaineers, they have always been known as an essentially agricultural people, acquainted with the same arts as the other peoples of Mexico. In their simple religion, deficient of the ceremonial and superstitious rites of the Toltecs, they seem to have preserved longer than others the purity of the ideas of natural law. They recognized only one God, creator of heaven and earth, to whom they gave the name 'Okha,' composed of O, which means remembrance, present notion, and of Kha, holy. For heaven they said 'Mahetzi,' from ma, place, he, extent, and tzi, in circumference."

"The first of their chiefs who had been their guide in Anahuac, named Otomitl, or Othon-Tecuhtli, in the Nahuatl tongue, received from them a sort of inferior worship. Two other less exalted heroes or divinities of their's are known, one called Atetein and the other Yoxippa. They showed most devotion to the last. His chief feast was celebrated in the fields; it lasted four days, which were passed in eating and drinking amid great rejoicings. They recognized also an evil principle which they said to be the author of all evil; they called it 'E' the malevolent. They attributed great power to their diviners and conjurers, and made use of their ministry to consult the gods and lay the souls of the dead. The chief of these diviners to whom the name Tecuhtlato was given, had the rank of high-priest, and enjoyed great reverence in his nation. The temple of Yoxippa was the chief sanctuary of Otompan; it differed essentially from the Toltec teocallis; for it had the form of a storied house with projecting roof, in the manner of Hindoo constructions, having an upper part sometimes crenelated that projected beyond the rest of the building. But it was on the heights that they preferred to offer their sacrifices; they prepared themselves by fasting and penance, like the Toltecs drawing blood from their ears with maguey thorns, and by ablution of the entire body, whatever the season might be. Up to the last years of Mexican monarchy, they were the only one of all the nations of these countries that continued the ancient calculation of time by lunations. Otherwise they had very nearly the same customs as the neighbouring peoples; they were dressed very similarly to the Mexicans, though with less grace and

elegance; but one thing in which they differed from all others, is that they habitually shaved all the head, with the exception of a little tuft which they allowed to grow on the summit of the occiput like the Chinese."

Brasseur's translations of Hiang-Hiung and Othomi are more than doubtful. The forms remind one of the Hiong-nou and the Hiun-yu of Chinese historians, who fabulously place their invasions of China before the Christian era. Latham and others suppose them to be the Huns, although, by the few words of their language transmitted, they have been adjudged Tartars. The word is Tungusic, for the Tungus call themselves Even and Evenki. Vangia and Feneche were two of their tribes, answering to the Déné Henagi. They seem to have been among the earliest colonists of the chief of the Japanese Islands, for Niphon is a corruption of the Tungusic Even. Seven hundred years before Christ they gave their name to Van in Armenia; and in the time of Darius, 522 B.C., a body of them were the Paeones between Thrace and Macedonia. Herodotus says they were a colony of the Teucri of Asia-Minor. The Ramayana and the Mahabharata of India know the latter as the Tucharas, and they are represented along with the head-shaving Yavanas, who were no Ionians but genuine Vuns or Huns. The Tokari fought with the Egyptians, and at times served as mercenaries in the armies of the Rameses. Arrian finds the ancestors of the Takullys or Tsekelnes at Taxila on the Attock, during the Indian campaign of Alexander the Great, and relates that their king Taxiles led 5000 Taxiles in the train of the conqueror. Strabo names some of the Turanian tribes that deprived the Greeks of Bactria, and among them mentions the Tochari and the Dahae, to which latter belonged the Aparni or Parni.

The name Othomi, in Japanese Otomo or Odomo, means the great attendant or follower. Its Canaanitic equivalent, for the family was of this origin, is Eshtemoa, or Eshtemoag, and out of this all the Othomi, Tungus and Déné forms have been evolved. What the Egyptians called the Eshtemoans I do not know, but, on the lips of the Assyrians they were the people of Zamua and Mazamua. This Zamua lay on the Armenian side of Taurus in the vicinity of Dagara and Van, and is mentioned as far back as the time of Assur-nasir-pal in the first part of the ninth century B.C. This was, doubtless, the region called Odomantis by the classical geographers, who have also an Odomantis in Macedonia and Thrace in the immediate vicinity of the Paeones, and having Mount Orbelus for its centre. This Orbelus was a sacred mountain and was eponymous, for the Armenian Stephen, Archbishop

of Siounia, relates that there came to Georgia from China a noble family called by him Ouhrbelean, to which he belonged. These Orpelians were Huns, and their supposed mythic ancestor is the Olbale or Odelbale of the Dénes, a winged deity like the eagle headed men of the Assyrian sculptures. His original was Amraphel, king of Shinar, the contemporary of Abraham; and his Shinar or Shingar gave name to Sangura of the Assyrians, the Sangarius of the Trojans, Sangala of India where dwelt the Cathaei, and the Sunggari-ula of the Mantchus.

The genealogy of the Tungus family is given, in a scattered form, in the genealogies of first Chronicles, and is as follows:

Tsochar

Shingar.

Amraphel.

Machpelah

Ephron.

Yephunneh.

Caleb.

Naham

Kegilah — Eshtemoa.

Garmi — Maacathi.

Zohar or Tsochar gave the ancestral name Teucer, Tokari, Zagros, Tuchara, Tochari, Taxila, Tsekelne, and was Tigil, the god of the Kamtchadales. In Shingar we find Sangura, Sangarius, Sangala, and Sungaria. Amraphel furnishes Orbelus, the Orpelian name, Arbela, and Olbale. Machpelah is the original of the Davenport Maka-Wala and of the early Mexican hero, Mixcohuatl or Mixco-watl. Ephron gives name to Apolloniatis at the Zagros mountains, to Strabo's Aparni, and to the Faraons of Mexico. Yephunneh's name is the root of Yavana, Evenki, Hun, Japan, and Henagi. Caleb probably survives in Arivaipa and similar terms. But Naham was the ancestor of the Biblical Naamathites, of the African Nasamones, as well as of the Tungus Neyen, and the Déné Nehane. He was very likely the ancestral dog of the Dénés, for in Tungus a dog is *ninakin*. After him the family divided into at least two branches. The elder in Kegilah gives the division of the Hans or Huns who peopled Corea, called Kaoli and Kaokiuli. From his son Garmi came the name Ghirin, and

the Corean word for man, *saram*. But, in classical story, Kegilah is a nymph Acacallis connected with Garamas, the progenitor of those Garamantes who were neighbours to the Nasamones. Finally Eshtemog has given us the Zamuans, the Odomos, and Othomis, and, by the change of m to n, the Tungus and the Dénés; and his son Maachath was the ancestor of the Massagetae, whom Herodotus likens to the Nasamones, of the noble Japanese family of the Masakados, and of the Othomi class called Mazahui, Mazahua, and Matzahua.

Few races are more degraded than the Dénés and Othomis of to-day; but few have had a greater history. Of the particulars of the lives of Tsochar and his son Shingar we, at present, know nothing. But Amraphel fought under the banners of Chedorlaomer; Machpelah gave his name to an immortal cave; and Ephron, the Apollon of the Greeks, the Hittite conqueror of Hebron, acted the chivalrous gentleman towards the bereaved father of the faithful. Yephunneh was Paeon, the physician of the gods, and, with his son, Caleb, or Aesculapius, seems to have exercised his art in Egypt. Classical story has feeble reflections of Naham and his grandson Garmi as youthful scions of the Teucrian Apollo, called Nasammon and Garamas; while another descendant of Naham, called Zophar, talked not too wisely with the afflicted patriarch of the land of Uz. Next, we find the Tokkari, wearing a helmet wider at the top than at the base, divided into coloured strips with disks of metal attached to it, descending on the back of the neck and fastened beneath the chin, carrying round shields with spears and short straight sword, and fighting against the Egyptian troops of Rameses IV., while their wicker work, oxen drawn wagons hold their wives and children in the background. Again they come before us as the ruling Hittite tribe of Northern Palestine and Syria in the days of Joshua, for king Jabin who ruled at Hazor was of their line. Jabin and his city, a Japanese Katsoura, were smitten by the Hebrew leader. About a century later, a second Jabin of Hazor sent forth his general Sisera to quell the revolted Israelites with his nine hundred chariots of iron, but Barak overthrew them at the springs of Kishon, and Sisera fell a victim to the treachery of Jael the Kenite, a member of a related tribe.

In the time of David, king of Israel, a body of this race, called the Maachathites, dwelt to the east of the springs of Jordan between Palestine and Syria, and made common cause with other Syrian tribes and the Ammonites against the pious monarch, but Joab overcame them, and David and Solomon ruled over Maachah. But, at least, one Maachathite was numbered among David's chief captains. The author of the book of Samuel calls him Eliphelet, the son of Ahasbai,

the son of the Maachathite; but he of Chronicles gives his name as Eliphal, the son of Ur. Here is Olbale appearing in ancient history. After this the Tokkari made their way eastward, to appear, at different times, about the Zagros range east of the Tigris, where Apolloniatis and the Garamaei marked their presence; at Singara on the Chaboras in Mesopotamia, with Zagora near at hand; and at Van in Armenia. Men of their race may have sat on Assyria's throne, for Tiglath as a name was their original property. From the time of Assur-nasir-pal, in the beginning of the ninth century till that of Sargon, in the end of the eighth, when the Hittite power was broken, they warred not altogether unsuccessfully against the greatest monarchs of their day. One of their race, to judge by his name Sangara, became lord paramount over all the tribes of the Hittite confederacy, and measured his strength with Shalmanezer II. (860-825), who received his daughter and the treasures of Carchemish, when the war ended disastrously for the Hittite army.

After their final overthrow by Sargon, they scattered. As the Teucri they made their way into Asia Minor, and, whenever the siege of Troy took place, they had part in its defence, as they had in the great Indian wars celebrated in the Ramayana and the Mahabharata. But the Greek and the Indian epics related to times far more remote than those which followed Sargon, and to lands nearer the primitive seats of population than Asia Minor and India. Still, the Teucri of the first named region were Tsochari, and they crossed the narrow channel into Thrace and Macedonia, where later they met the Persian Darius in the regions of Paeonia, Orbelus, and the Odomantes In the east they probably paid little regard to the Babylonian and Persian kings. Indeed, Herodotus informs us that the great Cyrus was slain by the Massagetae, oriental Maachathites of their race. Slipping away from the restraints of despotic power, they moved northwards to the Caspian, and further east into India, where Sangala and Taxila and Massaga, with many other memorials of theirs, existed long before Alexander the Great found Taxiles and the Cathaei of Sangala there. As the Tochari and Aparni, they wrested Bactria from Alexander's Greek successors in 150 B.C.; and the former in 124 B.C., defeated and killed Artabanus, king of Parthia, their kinsman or fellow Hittite. Their next appearance is as the conquering Hans or Hiung-nou of Chinese history, the chronology of which is entirely at fault. Then, in the west, in the fifth Christian century, under Attila, his predecessors and successors, they ravaged Europe, and disappeared into Asia. Under various names they governed the Chinese empire, as they do to-day; caused great displace-

ments in Siberia; occupied Corea, where they still remain; were probably the earliest occupants of Japan; whence, as the Othomis, they departed for America in the eighth century. Later waves of this fecund race, driven by stronger tribes into Eastern Siberia, crossed Behring Strait, and flowed over the Eskimo area, into the present abodes of the degenerate Dénés. It is doubtful that any other people whose history can be traced will exhibit a longer and more continuously eventful career.

I have said that, so far, we know nothing of the history of Tsochar, the ancestor of the Dénés, and, speaking strictly, this is true. But he was, no doubt, the Deucalion of the Greeks, a diluvian hero. His descendants appear to have separated during their abode in the Euphratean region, into a northern and a southern division. The fortunes of the former have already been before us. The latter became amalgamated with certain sub-Semitic Turanians, related to the original Amorites, Moabites and Ammonites, and, keeping a progressive eastern course along the Persian gulf and along the western and southern shores of India, arrived at last in the Malayan Archipelago. The Tagala language of the Philippines bears their name, but the well-known Polynesian god Tagala, Tangaloa, Tangaroa is the same personage as Tigil of the Kamtchadales. The southern Tsochari found their way to America as well as the northern, and appear in the central part of the continent as the Tzotzils and Cachiquels of the Huastec-Maya-Quiche family, whose great divinity was Tohil or Tockill. But their language, that of the ancient Huns, of the Othomis, the Mantchus, the Dénés, they had lost, and with it their modes of life. The Maya-Quiche records make what seem almost like prophetic allusions to this separation of the tribes and still more strange to their reunion in an American home. Echoes of the famous Tsochar may be found in all lands, from the Tigris to the Tigil, from the Greek Deucalion to the Maya-Quiche Tockill, from the Erse Declan to the Polynesian Tangaloa, and from an Assyrian Tiglath to a Déné Tsekelne.

APPENDIX I.

COMPARATIVE VOCABULARY OF THE DÉNÉ AND TUNGUS LANGUAGES

English.	*Déné.*	*Tungus.*
above	yadege, D.	widalin T., dergi *Mantchu.*
all	kontlan, kwantlan.	gemu, gandzi M.
arm	nala.	ngala.
axe	taih.	tukka.
	shashill.	shuko.
	thenl, thynle, tsintli.	tabor.
bad	tschoolta.	kaniult.
bark	alah, uluz, latuz.	urta, arekte.
	ttuz.	notcho, ogdykon.
bear	sus,, sas, zus, yas.	ugshuki, uchikan, kuti.
beard	edara, tarra.	tshurkan, gargat, sala M.
beaver	tsah, sha, zah.	chattala.
belt	shoedh.	boyat.
belly	kagott.	chukito.
	boer.	ur, oor.
	paput.	chefeli M.
bird	kakashi.	gasha, gaskha M.
	tsoje, tshiasi, tshetsha.	doghi, doi.
black	tkhlsune, klazin.	sakhaliyan M., sachrin.
	tarzi, dulkus.	kara M., tshakarin, atra (dark).
blood	sko, skai, tah.	shosha, shoksho.
	shtule, tutkhl.	sugal, soogial.
blue	detleze.	tshurin.
boat	tsai, tse, ttsi.	dsau, dyau, djacha M.
	allachi, shaluzi.	yraktadjau.
body	skotit, chezukhtai.	gudige, ukit (belly).
	ezi.	beye M.
bow	nettuny.	nonga.
	klintun, alhtin.	lunga.
boy	tshil.	churkonon.
	taiyuz, tsiah, tazyuze.	adzighe (small).
	dinias, tinji, tenair.	kunga, kungakan.
bread	kliuthchu.	kiltora.
breast	tsoo, tthu, adsoh.	tsct·hen M.
brother,	chah, kachaoch.	hau, aki, agi M.
	shona, schanga.	akin, kongakan, achun M.
buffalo	ahkik, yakkay.	ukur, hukur, kukur
	chasska.	chiukun.
	giddy.	geldak.
chief	nitzilin.	nyunga, noyon.
	buchahudry.	turun-bayo.
child	tshilaks, quelaquis.	uli, aljukan.
	beye.	buyadzui.
	is-chynake.	kungakan.
	astoque	chuto, kootian.
clothes	thuth, tsuda, tsthi.	teti, tetti.
	taiak, togaai.	etuku, tetiga, targaha.
	etlunay.	shun.
cloud	kkoh, kkswosh.	tukshu, taushu.

English.	*Dené.*	*Tungus.*
cold.	ktckchuly.	shakhorun, M.
	ssylitschitan.	serguen. M.
	oulecadze.	yellishin.
	nikkudh, hungkox, nasustli.	inginikde, ingynya, inginlan,
	kuatsakutowa, wuz-guz.	beichuen M.
to come	chatchoo, udessay.	tschiki.
copper	tsantsan-ilthose, thetsra.	tshutsheni, tshirit.
dark	tsaholkus.	hakteryakde.
daughter	nitchit.	unadju.
	siskai.	ashadka.
day	tiljkan.	tirgani.
	drin, klut.	tirga.
	can, cheengo, janes.	ining, inenga.
dead	itini, tazan.	buden, buddan.
	tultlun.	edderen.
	kous, cheechwit.	kokan, chivren.
deer	nista, neistzee.	kandachan (elk).
	maytzi, motchish.	kumaka.
	batshich, vutzaih.	buchu.
	tlaytchintay.	ladacha (elk).
	edhuu, edthun.	tooki, toki.
	istsi, yestshi.	shodjo, shokdjo (reindeer).
dog	klin, sleing.	ninakin, kazikan.
	tkhlin.	indachun M.
door	theoball.	utshe, tuga M., urki, urkipura.
to drink	esdan.	undau,
	chidetleh, totasinlh.	choldakoo.
	mljchny.	umdal, kolymtsham.
eagle	ttschukulak.	ggarri, kyren.
ear	chetzeh, hutjah.	udak M.
	szulu.	korot.
	xonade.	shan.
earth.	tlis, kliuth.	turu, tukalagda.
	an, ni, nun, nunkit.	na, dunda.
	te, teye.	tukata.
	altnen.	usin M.
to eat	beha.	bishin.
	ishshan.	dsheme M.
	chesti, setse.	iebdau, jebdaka.
egg	pukka, weskiake.	umcha M, omukha.
elk	pitzi.	buchu M. (deer), byyun (reindeer).
eye	eta.	eha, esha.
	slida, slinda, kaljag	esel, isal.
	chindar.	ashim-itshere (to see).
	sintaga, schindah	oshim-itshette (to see).
father.....	apa, appa, mama.	ama, ami.
fern	kokotlija.	okokto (herb).
fingers	inla-thale.	umukko-tshar.
fire.....	tasi, takak, takoua.	tua M, toh, tog, togo.
	kson, khong, kwun.	ghochsin (hot).
	tkhlkane.	chalchun M. (hot).
fish	telamachkur.	nimakha M.
	klo, kluk, luc.	ollo.
	cloolay.	olra.
	uldiah.	oldo, aldo.
foot	piuki.	betkhe M.
	skatlna.	halgan, chalgan.
	jetly.	bedal, bokdil.
	osha, chekeh, seka.	petche M.
forehead.....	kaintschit, tchunttsut.	onkoto.
	sekata.	olekat

English.	*Déné.*	*Tungus.*
fowl	kanujak.	njungjaki (goose).
girl	getsi, tshekias.	ashatka, asatkan.
	quelaquis-chequoi.	uljukun-ashadka.
	slku-tsukaisla.	sarkan-dzui.
	keel, kernihl.	ghoorkan (daughter).
to give	besanesdi.	pu, bimbi M.
	hamiltu.	omul, omuli.
to go	eenio.	geneme M.
	antonger, kwniuhl.	genigar, yanakal.
	unnainduhl.	nendep.
	anahzonti.	gyndakun.
god	tihugun.	gheooki.
good	sutchom, nezun.	ssain.
grass	klo, klos, kkloh.	orcho, orokto, orat.
great	unshan, nintsha.	ekzsham, egdjon.
	wane.	amba M.
	tsho, tcha, tchos.	okdi, choydi.
green	dellin, tultsau.	tshurin.
	dulkluj, tahtloh.	tshorolty.
hail	neelo, heeloah.	shenilyan, shiggilgen (snow).
hair	nuntsera.	nioorit.
	hutzee, khotsusea.	ingakta.
hand	nilah, inla.	nala, nali.
	shlaa, kholaa.	djalan, ngal, gala.
	skona.	hanga.
hare	kah, koh.	ushkau, tuhaki, toksyaki.
hat	sackhalle.	machala.
	kakadalaiou.	kuratli.
head	edzai, tichih, ethi.	udshu, utshu M.
heart	bitsi.	mudzi-len M.
	chittri.	shelama.
heaven	eeyah, yaha, yas.	abkha M.
	yatakahonzo.	thaugsoha.
	yuyan.	nyangna.
hot	taouwechon.	yapushin, ghochsin.
	kunazul.	khalkhon.
	nidha, nahdesestka.	nemyakde.
	woela, azoomicullah.	nyamlan, nyamaldan.
house, tent	ye, zeh, jetz.	dju, dzu, dzsho.
	kune, kuin, konaugh.	gula, gulya.
	kuntukh.	momadjuk.
hunger	kutlakat.	yatahushara M., djalgarram.
husband	sukkun.	eigen M.
	etsayoh, ahoteey.	adi, ediu, adywu.
	dinnie, deneyu.	edin.
ice	ttatz, thun, tun.	djuko, djucha.
iron	satsun, shatain.	tshutsheni, tshetshinma (copper).
	chitsih, ketic, atis.	djikta (copper).
	shlestay.	trirokta, ulatya-tshirit (copper).
kettle	ussa, oshia.	ika, iko.
	monsai, nosai.	mutshen M.
	kluck.	kalau, okallan.
knee	chagutt.	chiegen.
knife	utteis, tish, tekhe.	utsh.
	kissaki.	chueji, koto.
	marsh, penlso.	parta, purta.
	tlay, rsih.	tsherkan.
	kakikltoun.	hurta.
lake	touey, taiotin.	tonar, tongor.
	vun, ping, pungut.	amundji.
	maigah, mithee.	amuzi, amatch, amut.

English.	*Déné.*	*Tungus.*
to laugh.....	lechlikal.	inyaktokal.
leaf	ata.	abdaha M.
	atan, chitun.	awdanna, awdanda.
leg	tinadsun, nakaitshun, keitshin.	chantshen (knee).
	gwashun, tsethan.	chyegen (knee).
	kin.	ongon (knee).
	chidudh, edzare,	tyshak (knee).
length.....	kuana.	ghonamin.
life.....	anna.	inni, inen.
	ghinnah.	innikin, veichun M.
	kondaih.	indyn.
	renah.	ergen.
light.....	attri, hutkhlin.	tirga, tirgani (day).
lightning	nahtunkun.	talkian M tapkıtan.
	kwntatlek.	bugani-utula.
lips	edanne.	aedjen.
man	payyahnay.	boye, bey, evenki.
	tengi, tingi, tenghie.	donki, donggo, dunggia.
	déné, dinay, tana.	djan.
	titsun.	djetschen.
	quaietai, akootinne.	oydzah, djakuta.
	djoogia.	tazeu, togoya.
	khanae, sikkanne.	chingan, chuntshun.
	tenalo, tinlay.	nialma, onggolo.
	tchelaqui, tschilje.	antshulaku, sachaltsha.
	takhkhile.	djusheri.
marten...	thah, tshinih.	dyukon (otter).
moccasins.....	kinchee.	unta
	kihkot, keskut.	gulcha.
moon	altzi, ighaltshi, tlaltolla.	delatsha, dulyadja (sun).
	klanai, klaihonoi, tlakannu.	nultan, nyultan (sun).
	tschane.	shun, shigun (sun).
	haei, kacha.	bega.
morning	kadamatonah.	tematna.
	altkun.	erde M.
	vun, puneta.	unoki.
mother	amma.	eme M.
	nah, naa, anna, an, hun.	ani, oni, anya, enie.
mountain	ts-atl, tsutl, tidlkool.	tsolchon M.
	s-chell, klehl, tauri.	urra, ere, alin M.
	zeth, ddhah, chesh.	gokda, gokdakan, akatschan.
mouse	gloune, klounge.	tshalooktshan.
	tan	tshyngirkan, singeri.
mouth	nazai, nizik.	angga M.
	ta, edha, huzzay.	aedjen (lips).
nails	nil-assut.	osta.
neck.	wickkost, huckquon, hosewatl.	bilga, bilcha M.
	chekoh, schonite.	nikigi, nikin.
night	kleakut, kliltohl.	golban.
	hutlih, khutli.	aktera, atra (dark).
no.....	ossay, nokwa.	ako, aku.
	toh, ta, doo.	atcha.
nose	nenzi, ninintsis, mintshesh.	niqsha, onoktah.
	huntchu, chintsih.	ungata, ongot.
	hutchih, witchess.	ogot, oiokta.
old	ata, saiyidhelkai.	sakda, shagdi.
pain	iyah, tsin.	eyen.
pipe	tsikatsuh, tekatsi ; teka (tobacco).	tagon.
rain....	tchandellez.	tekdol.
	tsin, naoton.	odan, uddun.
	alkun, alcorn.	shiggilgan (snow).
	natkhlhika.	oloksha, ulaksha (wet).

English.	*Déné.*	*Tungus.*
red	tulkun, dulkun.	chulgian, fulachun M
	tiltil, tigaltil.	sugel (blood).
	delicouse, delksozi, tkhlssewe.	kulani, ulaty.
river	suckener, towkahuntsha.	sekiyen M.
	hun, khanee.	eyen M.
	okox, ukokh.	okat.
	sekargut.	ulagir.
	kutnu.	okatshan.
salt	tedhay.	tak.
	totuzlkun.	turuka, davusun.
sand	chey, shay.	chulikton, serugi.
sea	capashk.	amutsh, amuzi (lake).
to see	eshi, yussee.	itsheshim.
	utschtschiilia.	otschiawetshittal, etshikuerem.
	nestah, nentah.	oshinitschette.
	hunitlin.	ashimitschere.
	nhlin.	igoorun
to sing	shin, eschen, utshin.	ikan.
sister	chih.	oki.
	chidh, schutta, tatscha.	ashadka, asatkan.
to sit	dhintih.	teme M.
to sleep	namistee, nanistin.	amutshen.
	azut, tsetez.	adjikta.
	hoosh.	ukladai, ukladaku.
	ittern.	uklyarem.
small	netsul, unsul, nintsool.	nitkun, nitshukun.
	sul.	chulyokun.
	tsootah, astekwoo.	adzighe.
snake	nadudhi.	nogai.
son	ziazay, naskai.	hutta, dzui M.
soul	eyune.	weichun.
to speak	yatltik, yaltuck, katlijach.	goli, turateikta.
	kanna.	guken, chendumbi M.
spoon	schitl.	kuili M, tschinaka.
spring	olte, agoltsin.	obhilasha.
star	sii.	usikha M.
	klune, shlum.	haulen.
	sun, sum, ssin.	shen, shigun, shivun (sun).
	delgayhe.	dylega (sun).
	khatlatshe	delatsha (sun).
	kumshaet, keemshaet.	utamikta.
stone	luohla, tschayer, kulchniki.	djolo, dzshool.
	zeh, seh, chi, tscha, tse, tsi.	ja, hysha, veche.
strong	gunzun.	chusun M
summer	hongzil.	anganal.
	ssin, saner, tan.	dyoganni.
sun	ytlkun, taltohna.	tergani (day).
	chignonakai, chokonoi.	shigun, siguni.
	channoo, skeemai.	shun, shivun.
teeth	egho, howgo, howwah.	veihe, veike M.
	shti, esu, shigo.	itsh, ikta.
	sakoistli.	iktal.
thread	mo.	umi.
thunder	idi.	addi, akdi, ashdoo.
	titnaik, nahtuno.	akdjan.
to-day	ganneh, kuntsin, ganitzin.	enenngi, eshenang.
	antil.	ositirga.
to-morrow	karooman.	tumi.
	gambeh.	chimaka zimacha M.
	punti.	temanta.
tongue	tzula, natsol, thula.	tsholi.
	tljulja, szylio.	ilga

English.	*Déné.*	*Tungus.*
tongue.....	lasom.	ilengu.
	kanat.	yuiye.
tree.....	chooma	mo.
	tetshun, takun, techun.	budjan (forest) M,
	tsbalacooya.	mol (forest).
valley	dilakooi, tekalkulkul.	tala.
	konakon, kunatri.	koonta.
village	kohalai.	falan M.
	zekkeh.	tokso M.
to walk	ts-aiutl, gahheyail.	shurukel (to go).
	kaeendie.	gynakun (to go).
	yucko kuyyaj.	yavkan yanakal (to go).
water	to, toh, toe, too, tkho.	tygda (rain).
	thunagalgus.	tekdol (rain).
	tchon, tonh, tahnahn.	udden, odan (rain).
	chu, kaja, ko.	agha (rain).
to weep.....	huntza.	shongodz.
white	kliyul, hlekul.	giltaldi, giltaldin.
	talkai, delksay	geltadi, wagdari.
	itesina.	shangiyen.
wife	sak, at, tsaiat.	aki, aji, asi, adjiu, atshiu
	zayunai, tsekunselin.	sarkan M,
wind.	atse, etsee.	eddyn
	tatsi.	tit (storm).
	nuntsi.	ayanedun (storm).
	eldo.	niltse.
winter	hongkazone.	togonni.
wolf	yess, yush.	gusko, gushko, gusika.
	nooneeyay.	nioche M
wolverine	naguiyai.	yentaki.
woman	tseke, shiko, ekhe, chaka.	heghe, cheche.
	etchagah, tseukeia.	adjiu, atshiu (wife).
	ttsekwi.	ashiwu (wife).
	salturn.	sarkan M. (wife).
wood	tetshun, dekin, dethkin.	budjan M. (forest).
	tsush.	shigi, ishig (forest).
	tsroh.	urae (forest).
wood, forest.....	teshintlan.	kenita.
to work	chakljtschejahga.	goorgalden.
to write.....	edesklis.	dokli, dokukal.
yellow	tatloh, dethore, tultsau.	shurin.
yes	ha, hauh, ahuh, aho.	ya.
	ang, hum.	inu M.
yesterday	hulta, utlta, utlutltan.	acheltana (evening)
young	kechitedha.	asicha, ashcha.
	klatakoltinilla.	noolsoolktshan.
I	hwe.	bi.
Thou	shi.	ssi, si.
He	iye, iyi.	i.
	atinne, edinne.	tere.
	neyan, iyanuk.	nongenatsha.
We	wane.	be, boi
	ninkontlan, nachune.	nonganube
You	she, kajuku.	soue, sowe.
	hontail.	ellia.
They	tsii.	tese, tche.
this.	eyer.	ere.
that	tiri.	tere.
many, much	lai.	labdu.
who ?.....	nuntzui.	ni.
	mpela.	we.

English.	*Déné.*	*Tungus.*
1	tahse, tashte, etscha, titsoh.	dysak, dishak, *Kamtchadale.*
	tihlagga, tathlai, kissleka.	attajlik, *Tchuktchi.*
2	naki, nake, nahkee, nekai.	niechtsh, *Koriak.*
	nankhay, nankuh, nankoh.	lianga M.
3	tahe, tage, takke, takei.	tsok, tshook, *Kamtchadale.*
		digin, digon, *Tungus* (4).
4	tang, dunkhe, tinike, tenki.	douin M.
		tonga, tongan, *Tungus* (5).
5	chwola, shwullak, schwallah.	komlch, *Kamtchadale.*
6	elketahey, ulkitake, kooslak.	kilkok, *Tungus.*
	tluz.	kylkoka, *Kamtchadale.*
7	tluzuddunkhe, ookaidingkee.	etgatonok, *Tungus.*
		etuchtunuk, *Kamtchadale.*
8	elkeedinghe, etsudeentay.	tshokotenok, *Tungus.*
		tsholudunug, *Kamtchadale.*
9	koostenekha.	tshakatonok, *Tungus.*
		tshakatanoch, *Kamtchadale.*
10	kaynayday, kwunesa.	kumechtuk, *Kamtchadale.*
		tshomkotak, *Tungus.*

APPENDIX II.

COMPARATIVE VOCABULARY OF THE OTHOMI WITH THE TUNGUS AND DÉNÉ LANGUAGES.

English.	*Othomi.*	*Tungus and Déné.*
afraid	ttzu.	nil-tshut D.
arm	ya, yani.	mayan T., hanga T. (hand); kiin, skona D.
axe	ttagi.	tukka T.; taih D.
bad	iho, hio.	ekhe T.
	hing, nantzo.	eiang T.; nuntzun D.
beast	baoni.	boyun T.; elloni D.
belly	bite, bombi.	boya T. (body); bitt, voet, paput D.
bird	ttzintey.	niungyaki T. (goose), doghi T.; tsihtsoh, dettani D.
black	boi, bede, bothi.	bochokon T. (dark).
blood	qui.	shosha T.; skai D.
blue	ccangui.	niochun T.
boat	mohtz-a.	omu, ongotscho T.; metaui D.
body	ghai, hanggiei.	ukyt T. (belly); ezi, nizi D.
bone	ndoyo.	nun-kwut D.
bow	za.	ka, kaza D.
boy	hy, iso.	huta, dzui T. (son); jay, eyaze D.
	bahtsi, butsi.	buyadzui T.; yaase, eyoze D.
to break	yaxkhi, sogi.	bekkeschiz D.
brother	cu, ida,, qhuada.	aki, deu, ekdau T.; chah, de, skitla D.
to call	da	
cane	sothi, hethyo.	tetquh D.
chief	hmu, nogue.	hunniu, nyunga T.; mowdish, toeneza D
cloud	gui.	tuhu, tugi T.; kkoh, kos D.
cold	tzaa.	shakhorun T.; edzah, azoo D.
to come	ehe.	dsi, ishi, dohi T.; yeudessay D.

English.	*Othomi.*	*Tungus and Déné.*
corn	detha.	djekta T.; djiye D. (fruit).
to dance	nei.	uznutti, noetai D.
day	pa.	shiwun T. (sun); vun, puneta D. (morning)
death	tu, du.	butscho, edderen T.; tatsai, itini D.
deer	phantehe, hoephani.	buchu, kandachan (elk), bayun (reindeer) T.; batshich, ed-hun D.
to descend	cai, gai.	
to do make....	qha.	scha, kia, gia T.; ah-goshlah D.
dog	tzahtyo.	katshikan, indachun T.; tlika D.
door	gosthi, nyytti.	utsche, tugha T.; tathi D.
to drink	tzi, tzithe.	djebdau T. (to eat); esdan, chidetleh D
eagle	xyni.	kyren T.; datanni-tchos D.
ear	gu.	korot T.; ocho, zach D.
earth	hay.	na, usin T.; keia D.
to eat	tzi, tza.	dsheme T.; setze D.
egg	mado, doni.	oomta, omukta T.; pukka D.
enemy	noogui, ytzaqui.	enna, ats-choen D.
evening	nde.	yamdzi T.; naai, nachiai D.
eye	da.	eha, esha, tuambi T. (to see); eta, ente D.
to fall	tagi, dagi.	
family	qhai.	koh D. (house).
far	yanih.	antshun T.; nizat, nijah D.
father	ta, hta.	ata, tah D.
feather	sihui, sini.	tsuth, tshus, tah D.
female.....	nsu.	nechu T.; ttseyanne D.
field	batha.	pitema, bikan T.
finger	zaha.	simchun T.; slutska D.
fire	dehe.	toh, tua T.; tasi, takok D.
fish	hua.	ollo T.; lue D.
flesh	ngoe.	
flint	asdo, dotzbi.	
food.....	hme, thuhme, nhihuni.	omin, omekin T. (hungry); then, utsun D. (flesh, meat).
foot	gua.	eke, oca, cuh D.
forest	borza.	ure, mol, budjan T.; tsbalacooya D. (tree).
friend	ntybe.	unte D. (love).
from....	nbepha.	noempa D.
fruit.....	doengahu.	djiye, njet; intzi D. (strawberry).
girl	ttixu, nxubahtsi.	ashatka, hettek, unadjikuto.T.; tshekias, dettsi D.
to giye	ra.	
god	oqha.	gheooki T.; tihugun D.
gold	ccaxtti.	djikta T. (copper); atis; chitsih D. (iron).
good	nho, manho, niza.	etnioo, sain T.; nuzzo, nezun, ienesou D.
grave	ha, yagi, otzei.	changar T.; tsungut D.
great	na, mannoho, ndi.	amba, hadyuga T.; wane, nintsha, unshaw, nitsih D
green	buethe.	owokto T. (grass).
hair	si, xta.	ingakta T.; zuga, itse, ethisa, hutsee D.
hand	ya.	hanga, gala T.; la, lah, law, skona D.
head.....	na, naxmu, nasinu.	onkoto, shengin T. (forehead); nuntse, muttsai D.
heart	myi.	mewan, mewam T.; se naiyitz, bitsi D.
heaven.....	mahetzi.	abkha, niengnya T.; yatakahonzo, nuntsi (air) D.
hot	pa.	yapushin T.; wuzul, wela D.
house	ngu, buy.	momadjuk, boo T.; konaugh, koh D.
hunger	thuhu.	djamushim, yuyun T.; tai D. (famine).
husband	dame.	edin T.; deneyu, dinnie D.
idol	hetqha, phetrigha.	yuttoere D. (god).
kettle	tzamqua.	mutshen T.; monsai, sehin D.
to kill	ho, hio.	kokan T. (death); uzeagha D.
knee....	nahmu.	nyongi T.; nakaitshun D (leg).
knife	daquhuai.	chueji, koto T.; tekhe, texe D.
lake	mohe, posdehe.	omo, amuzi, amutt T. (sea); maigah, pungut D.

English.	*Othomi.*	*Tungus and Déné.*
to learn	padi, deji.	tatshin T.; udhestthan D.
life.	te, byi.	indyn, veichun T.; guttah, mainch D.
ight	hiattzi.	tek, erde T. (morning); attri D.
ightning	nhuei.	nyama T. (flame); nahtunkun D.
lizard	matga, botga, ttzathi.	mogai T. (snake); nadudhi (snake), ttsale D. (frog)
to love	madi.	amuran T.; nute D.
male.....	ta.	edshe T.; ten D.
man	yeh, yehe, nanyehe.	bey, khiakha T.; sykka, enday D.
	dame.	edin, donki T.; dini, tana D.
month	zana.	men, nan D.
moon.....	zana, rzana.	shen T. (sun); tschane D.
morning	sudi, hiatzi.	tek, erde T.; katoomau D. (to-morrow).
mother	be, me.	eme T.; amma D.
mountain	tthehe, ganthe, xantle.	dabaga, gokda, yang, davan, emkir T.; zeth, ddhah, tzatl D.
mouth	ne.	anga T.; nazai, nizik D.
name.....	thuhu, thohr.	gorbi T.; kedetude, vorzih D.
near	guethua.	khantchi T; nihtuk D.
night	sui.	shikshe T. (evening); tsis, hkah D.
no.....	hinna.	mangga T.; owntuh D.
north	moby, mahuihgi.	
nose	siu, xiyv, xinu.	ogot, ongata T.; hutchin, hutchih, chintsih, nenzi D
now	nuya.	enenggi T. (to-day); ganneh D.
pain	dumyi.	choonatsh T.; tsin D.
rabbit	qhua.	tuhaki T.; koh D.
rain	ye.	agha T.; chu, ko, kaja D. (water).
rainbow	beccni.	bohre T. (bow).
red.....	ntheni.	ulatyn ; sengi T. (blood); dulkun D.
river	dathe.	okat T.; tesse, taseke D.
salt	u.	davusun, tak T.; tedhay D.
sea.....	munthe.	amundji T.; pungut D. (lake).
to see.	nu.	omnin T.; aiin, nentah D.
shoe	zethsi.	unta, gulcha; dootan T. (stocking); keskut, kinchi D.
sick	gehe, hienni.	eyen T.; eya, tinnetuh D.
sin.....	tzohqui, ttzogi.	kotat, ssui T.
to sing	tuhu.	ikan T.; shin, hutyhn, tsutshun D.
sister	nqhu, qhuhve.	nougu, ekmu T.
skin	si, siphri.	feri, ipree T.; uzuz, eve D.
to sleep	cha.	adjikta T.; azut, tzetez D.
small	ttygi, notzi.	adzighe, nitkun T.; astekwoo, nacoutza D.
snake	qqena.	meike T.; itini ; tanenuz D. (rattlesnake).
south	madatti.	
star	tze.	ujicha, otshikat T.; sii D.
stone	do.	djalo T.; tsi, tse, ttza D.
sun	hiadi, hindi.	dulyadja, shen T.; shethie, houtsah, channoo D.
to take.....	ha, hiani.	ghenoom T.; eneshi D.
teeth	tzi.	itsh, ikta T.; esu, shti D.
thunder	nyquni.	akdjan T.; indnaih, titnaik, nahtuno D.
to-morrow....	nisudi, rihiatzi.	tshaguda T. (after to-morrow); katooman, punti D
tongue	qhane.	inni, enga T.; kanat D.
tree	bay, rz-a, camrz-a.	mo ; yraakte (larch); obkomchora (juniper) T.; chooma, tsbalacooya ; tsroh (wood) D.
turtle	saha.	
to walk	yooni.	genembi T.; kaeendie D.
wall	ghoti, ghado.	
war	ncasi, tulmi, magagui.	chooniat, koosikatshin, dzshargamat T.; tatzuzan, taiatltzan (to kill) D.
water	dehe.	tygda (rain) T.; tu, toah D.
to weep	rzoni.	shongon T.; huntzah D.
a well	cyytzi.	yuukto, guiudzeren T.; kwtzil (wet land) D.
west	mayyi, yyhiadi.	

English.	*Othomi.*	*Tungus and Déné.*
white	ttazi.	geltadi T.; itesina D.
wife	datzu, ghada.	adjiu ; cheche (woman) T.; ts-aiat, at D.
wind	ndahi.	edden T.; nuntsi D.
wing	hua.	utah D.
wolf	muhu, tzute.	nioche, tshipkaku, gusika, galyuki T.; nun, nooneeyay, yes, tsheeonay D
to work	paphi.	
woman	nsu, nitsu, danxu.	nechu, djoanatkan (female) T.; kyssynj, ttseyanne D.
year	gheya.	angaui T.
yes	haa.	ya T.; ha D.
yesterday	mande.	yamdzi (evening) T.; pundata (morning); hulta D.
I	nuga, nugui, nugaga.	niyun, tsunuz D.
	di.	siit D.
Thou	nuy, nugue.	nannuk, nunuz, nin D.
	qui.	shi T.; shi D.
He	nunn, bi Y.	nongenatshe, i T.; unna, neyan, iye, iyee D.
We	nuguihe.	nongenoobe T.; noohee, nachune D.
You	naguegui.	sonwe T.; nahhinne D.
They	nuyu.	eyiniyu D.
1	na, ra, unra.	ennen *Koriak* ; inlase D.
2	yoho.	ytechgau K.; techa D.
3	hiu.	giech K.; kahyay D.
4	gooho.	sfigae T.; gyrach K.; teucheh D.
5	cytta.	soundeha T.; chiht-lukunli D.
6	rato.	lugae, kilkok T.; elkketase D.
7	yoto.	etgatanok T.; hoituhi D.
8	hiato.	djakun T.; etsudeentay D.
9	cyto.	dshugae, tshakatsnok T.; coostenekha D.
10	ratta, ra-tta.	djulaka T.; atltshantai D.
100	cytta-te, nanthebe.	nemadje, ibai T.

SPATIAL THRESHOLDS OF COLOURS AND THEIR DEPENDENCY ON CONTRAST.

By W. B. Lane, B.A.

(Read 3rd April, 1897.)

If one takes any coloured object of small, definite size, say a piece of pigment paper, and gradually either removes himself from it, or causes it to be removed while he remains stationary, he will notice not merely that the coloured object decreases in its apparent size as its distance increases, but also that its colour becomes modified and even disappears as the object becomes to the sight extremely small. Ordinary illustrations of the same phenomenon are quite common in our daily experience. We have all noticed, probably, how across a stretch of two or three miles of water a small craft, say a skiff, painted green, has appeared to have, at first, no colour whatever, being merely a bright or a dark spot upon the blue surface of the water. But, on gradual approach it has become invested with a colour quality which is more than mere brightness or darkness, though it may appear at first in a colour, such as *red*, quite different from its true colour disclosed on still closer approach. Such, among the many other examples which probably suggest themselves in plenty, to anyone disposed to search his past experiences, serve to show that in this fact there is scope for a scientific inquiry to determine the minimum sizes at which the various colours are seen coloured in their proper tone. This is the problem of the Space Threshold of colours in a general way. Of course, in reckoning the sizes of the coloured objects we must consider their size as relative to the eye observing them, for their absolute size does not necessarily change when their size, as relative to the eye, may have changed greatly. The absolute size, indeed, may change and the object remain fixed in one place, which would equally, if the observer remained stationary also, produce an alteration in the size of the object relative to the observer's eye. We can, of course, obtain an exact expression for the relative size of objects to the eye by means of the visual angle which they subtend at the eye, which is the same whether the object be multiplied in size or merely decreased in distance in the

inverse ratio. There is a little difference caused by the aerial perspective according to which coloured surfaces of greater distance have to appear less saturated and even modified in colour on account of the imperfect translucency and bluish colour of the air. This applies to the ship. Consequently the Spatial Threshold of colours will always be measured by the visual angle of the coloured object, where we say it is at the threshold of discernment as such or such a colour.

We have mentioned the fact that a coloured surface at very small angles, gradually, in most cases, loses its characteristic colour and becomes coloured in another tone, and at smaller angles still, loses its chromatic quality altogether and appears as merely colourless light. It thus appears that there will be three distinguishable Spatial Thresholds for any colour. (1) The main one which we may designate the Characteristic Colour Threshold, where the colour is first seen correctly in its proper tone, (2) the Chromatic, where it is first visible in any colour whatever different from colourless light, and (3) the light or Achromatic Threshold, where a coloured object is first perceivable at all, not necessarily as coloured but as colourless light. It appears desirable to keep these three Thresholds separate, though, of course, they can quite easily be investigated concurrently, because, in determining the main Threshold as to the visibility of colours in their proper tone it is necessary, starting from zero, to pass through successively the two minor Thresholds. Hence, the one set of experiments can with care be made to exploit at the same time the three Spatial Thresholds of colours.

A moment's reflection will show us, moreover, that the problem of the Spatial Threshold of colours cannot be prosecuted except under the conditions of the phenomena of contrast, to a greater or a less degree. We never, as a matter of fact, can get our colours except as they are environed by surfaces which exercise a more or less effectual contrast influence upon them, whether it be merely a light contrast or a saturation contrast (*e.g.*, grey of equal intensity with the ground) or ordinary colour contrast, or a combination of two of them or of all three. But although apparently impossible to escape altogether from the conditions of contrast, it was, undoubtedly, a scientific desideratum to free our experiments from an irregular and uncontrolled participation of contrast influence. It is quite possible to eliminate large elements of a mixed contrast influence and to confine its operation to that of either simply intensity contrast, where colour contrast has been removed, or of colour contrast simply where intensity or light contrast has been removed. The former is possible by employing only colourless grounds on which our colours are seen, grey, white or black grounds; the latter is much

more difficult to achieve, but quite possible by using colour grounds and employing precautions to secure that the brightness intensity of the ground is the same as that of the colour examined. The devices and detailed means, used to secure this result, cannot be described at all in this preliminary paper, but will legitimately find place in a subsequent paper giving illustrations, detailed description of the apparatus used and our results attained. It may be noticed that a theoretical immunity from both colour and intensity contrast is possible by using a grey ground whose intensity is the same as the colour examined, but practically it is very difficult, next to impossible to achieve. For, in getting the two intensities equal and constant, you are forced to introduce a more or less influential colour element in the ground; and in seeking to remove the colour element wholly, it is difficult to avoid introducing an inequality of brightness intensities again. But, be that as it may, there is no question of the scientific desirability of an attempt to limit the influence of contrast phenomena upon the determination of the Spatial Thresholds of colours to specified kinds of contrast, colour contrast at one time and purely light contrast at another, so that the specific effect of each upon the Spatial Thresholds may be discernible from that of the other instead of both being massed in a joint influence in which the contributions of each kind of contrast are indistinguishable with any exactitude. It was, moreover, a matter of scientific importance to make the attempt to rule out the contrast influence, both colour and intensity, altogether, even though actually it may not have been absolutely successful in doing so. In any case, it will have reduced the contrast influence to a degree so small as to be a minimum up to date in the investigation of the Spatial Threshold of colours.

In the history of physiological and psychological science this problem of the Space Threshold of Colours has received but scant, almost cursory notice. Where there has been some approach to a scientific determination of it quantitatively, it has been marred by a twofold defect. On the one hand, the investigation has been carried on by means of appliances which are extremely crude and inaccurate, and on the other hand the inquiry has been wholly confined to exploiting only one kind of contrast influence, namely, light intensity, which may have a bearing on the Threshold. It has wholly ignored the roles which other kinds of contrasting environs, such as the various colours of our ordinary colour system may have, and practically do have, upon our perceptibility of colours, according to their size of exposure as relative to the spectator. It has, moreover, apparently, not seen the desirability of modifying extremes in light intensity contrast and of obtaining, if possible,

an environing ground which shall practically exercise a very small or even no appreciable contrast influence of any kind upon the examined colour. But it is evident that without so doing no approximation could be made to a discovery of the precise degree to which the influence of contrast modified the Spatial Threshold.

Quite early the phenomenon of the dependency of colour perception upon intensity and on the visual angle of the coloured surface was noted by Purknije in his Commentatio de examine organi visus 1823. Plateau shortly after in Poggendorff's Annalen, 1830, noted the disappearance of colour tone altogether at small visual angle. However, the problem was not dwelt upon, perhaps not appreciated by these early investigators. No effort was made to make an exact inquiry into the relation of visual angle and colour perceptibility until the time of Von Wittich and Aubert, both of whom made some important pioneer attempts in this direction. Von Wittich distinguished the two Spatial Thresholds which we have mentioned, namely, the light, or achromatic threshold and the chromatic threshold, and he sought to obtain a quantitative representation of the same. He conducted his experiments upon a black and white ground respectively, thus really taking into account the fact of a contrast influence in the determination of the thresholds. But apparently, as we have indicated, he did not appreciate the desirability of extending the enquiry to include other kinds of contrast. Much less did he think of determining what role the contrast, as such, played in the matter, by seeking to reduce it to a minimum or to remove it so far as intensity and colour contrast, altogether.

His experimental work on this question was crude in many other ways than in the scope of its attempt Its physical appliances, such as the means used to obtain colours and grounds,its measurement methods, were all of the crudest and are consequently unsatisfactory in the results yielded thereby. The colours which he experimented on were simply ordinary pigment papers which in these latter days, at least, are well-known not to be pure specimens of the colours which they are taken to represent. For the most part, on the contrary, they contain very many other colour elements obscurely fused with the one which, from its predominance, we call the colour of the pigment. In some cases the pigment paper may owe its special colour to the fact that it contains all the other elements of the colour system except the complementary of the colour after which we name it. For example, the most yellow pigments owe their colour to the fact that they contain the whole spectrum of colours except the blue, and even in somecases this

is present but much weakened. Moreover, a pigment may owe its colour to a combination of other coloured rays without having any of the kind after which it is named. For example, it is possible to find a violet pigment which sends forth no direct violet rays at all, but a combination of blue and red. Such being the case it was certainly a desideratum, which, by the way, our experimental handling of the problem has sought to satisfy, namely, to secure specimen colours which should be tolerably free from this adulteration by other colour elements, and fairly representative of the spectrally pure colour tones. In the absence of any attempt to obtain spectrally pure colours to operate upon, as was the case with Von Wittich, it is evident that the results must embody at least, a double unavoidable defect which renders them scientifically useless. On the one hand, since the colours experimented upon are actually, in each case, a congeries of many colour elements it cannot be determined, even approximately, what specific part each of the various colour constituents contributed to the determination of the Spatial Thresholds of the colour pigments employed. On the other hand, since no two pigments, even representing the same colour tone, will emit exactly, or even closely, the same combination of colour constituents because of the fact that a variety of colour combinations can produce the same aggregate effect, and since further, there are a great many pigments all differing in appreciable degrees which have equal claims to be taken as representative of any colour tone, it follows that experiments such as Von Wittich's, based upon the examination of colour pigments taken up at random, can have no general validity. They cannot be considered at all as representative results for the main colour tones which compose our colour system. They are, at best, only indicative of the thresholds of those particular pigment papers which Von Wittich used and which can never be reproduced with any surety for any one else's experiments, simply because there was no attempt made to secure, and hence, no record left of a diagnosis of their colour constitution.

A similar objection can be urged against his method of securing black (and also white) grounds, upon which the colours were placed for research. *Black* ground is a very indefinite quantity which may mean a great variety of black surfaces, all differing in the degree of their blackness. It is well-known that the surfaces which we ordinarily designate black in reality reflect a considerable quantity of light and are hence very far from being absolute black. Dr. Kirschmann has made some investigations along this line with the purpose of finding the relative brightness of different so-called blacks to white. His methods

are described in his article, "Ein Photometrescher Apparat Zu Psychophys. Zwecken," some of whose results described therein I subjoin :

I. PARIS BLACK :

(1) in lamplight (petroleum) is $\frac{1}{75 \cdot 5}$ or $\frac{1}{75}$ of white.
(2) in gaslight..... $\frac{1}{50}$ of white.
(3) in diffuse daylight . ..... $\frac{1}{67 \cdot 5}$ of white.

II. CHINA INK :

(1) in lamplight .... $\frac{1}{72 \cdot 5}$ of white.
(2) in diffuse daylight ..... $\frac{1}{76 \cdot 5}$ of white.

III. GRAPHITE (Faber B.B. Pencil):

(1) in lamplight.. .... $\frac{1}{4} \cdot \frac{1}{3}$ of white.
(2) in diffuse daylight ..... $\frac{1}{4} \cdot \frac{1}{3}$ of white.

IV. A specimen of black cardboard in sunlight was $\frac{1}{5}$ of the intensity of white paper in sunlight.

It consequently follows that, unless we employ some means of specifying the particular black which is used in the ground, the results obtained can have only a private importance and not presume to be representative of the space threshold judgments of colours on a black ground. For it is evident that with two variables in regard to brightness, such as the colour pigment, and the unspecified black ground used must be, it would simply be impossible to know to what degree the influence of intensity contrast participated in the determination of the thresholds for any one colour, much more to what different degrees it entered in the determination of the thresholds of the other colours. It might appear that it is sufficient if only the colour and ground are subjected to the same illumination, for, at first sight, it might seem that this would secure a constant brightness relation between ground and colour. But a moment's reflection shows us that this would fail to ensure the constancy of this contrast relation throughout the various colours because of the fact that different pigments under the same conditions of illumination reflect light in varying degrees. Hence, if the illumination remained constant there would be a variation in the light intensity relation of colour to ground, for each of the colour pigments used, which would, of course, preclude the possibility of there being a quantitatively uniform contrast influence throughout, contributing to the space threshold determination of the various colours. This taken in connection with the fact that there is no clue to knowing the

specific character of the black ground used by Von Wittich, would render his results of small value for scientific purposes, because there is even no ground for forming comparison as to the relative magnitude of the space threshold for the various colours.

In our own experiments, I may say, we sought to remove these deficiencies in the work of Von Wittich by securing, on the one hand, an absolute black, or as near an approach as practicable, and on the other hand, by ensuring that the brightness intensities of the colours were so regulated that their relative brightness as compared with the ground was constant throughout their entire range. How this end was practically achieved we do not propose to describe at length in this present paper, but, suffice it to say, that we were successful in attaining an approximation to this constant intensity contrast relation which was substantially complete. This was done, on the one hand, by using a black ground which was black because of the exclusion of light from it, and was viewed through a long darkened tube with a diaphragm at the end, the inner surface of which diaphragm constituted the black ground, and the adjustable aperture of which became the coloured surface by reason of the coloured light entering through it. On the other hand, we refused to employ daylight illumination because of its uncontrollable and inconstant intensity, but used instead incandescent electric lamp illumination which by controlling the distances of the lamp from the different coloured surfaces illumined in such a way that their brightness was in each case judged equal to that of another standard illuminated surface, gave us a series of position marks of the lamp for the respective colours wherein their intensities as light were all equal.

After Von Wittich, Aubert took up this same problem, and, with a few improvements, followed largely in the footsteps of his predecessor, repeating to a large extent the same errors which we have noticed. Like Von Wittich he used ordinary pigment papers for his colours without any correction of the inaccuracies incident to their use, and for his black ground ordinary black cardboard. As we should expect, his results do not agree with those of Von Wittich at all, which only goes to show the truth of what we have already pointed out in reference to Von Wittich's results, viz.: that they are true only of the particular pigments which Von Wittich used, of private and not general validity.

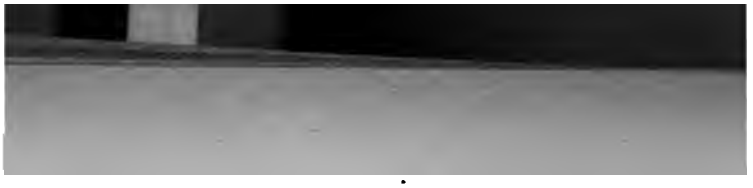
The method of observation and measurement of the thresholds, employed equally by Von Wittich and Aubert, was also very crude. They took coloured objects and removed themselves gradually away

rom them until the colour quality of the objects began to change, and finally disappear from the spectator. Then they gradually approached again noting carefully their distance from the coloured object when it first became visible, and second, when it first became visible as coloured. Now it must appear that such a method of procedure, besides being subject to great inaccuracies in measuring the slight transitions of distance, often sufficient to cause a great change in the appearance of the coloured objects, is open to the serious objection of not providing for the influence of anticipation in lowering the threshold judgments of the colour as seen in their proper tone. According to this method the observer is familiar with the colour to expect, and this fact must of course materially modify the ease with which he detects the colour tone of the object gradually growing into view. In our work we avoided both these imperfections, viz.: of crude measurement methods and threshold modification from anticipation. We performed our experiments in such a way that the observer was quite in ignorance as to what colour in each case he might expect. The result was, of course, that the observer had to decide among the various spectral colours and their transitions quite upon their own merits and not according to information previously possessed as to what might be expected to appear. On the other hand, instead of employing the gradual departure or approach method of varying the visual angle of the coloured objects, we adopted the plan of keeping the distance between object and observer constant and varying the size of the coloured object through gradual transitions. In this way, by a very skillful contrivance described elsewhere, we were enabled to measure the transitions in size with minute accuracy to at least $\frac{1}{1000}$th of an inch, or even closer if desired.

As was to have been expected, our experimental results on the black ground, do not tally with those of Von Wittich or Aubert, who likewise do not correspond in results with each other. It would have been rather peculiar, in fact, if it had come about that our results corresponded with theirs, especially where peculiar care was taken to remove the several inaccuracies which we have noted in their mode of procedure. With the removal of the adulteration of tones in the colours experimented upon, and the regulation of a variable uncertain contrast influence, such as played an important, though unsuspected, role in their work, to the end that it became a constant quantity with us, and with the specially superior accuracy of our measurement apparatus, it would have been remarkable indeed had the results not differed materially from both Aubert's and Von Wittich's who took none of those

precautions. And, as a matter of fact, the divergence is quite according to the expectations we would naturally form in regard to the matter. In fact, so materially and in all points different were the conditions under which these investigations were carried out that it is scarcely instructive, scarcely worth while to institute any except the briefest comparison between their results.

However, before referring further to the results of a more accurate method, we will briefly notice a set of experiments which we made upon this problem, largely under the same crude conditions as Von Wittich and Aubert made theirs. We employed, as they did, uncorrected pigment papers for our colours, and daylight illumination. We had, however, a very fine specimen of black ground, approaching about as close as possible to an absolute black—which we attained, not by using a black cardboard illuminated by the same light as the colours, but a black surface from which all daylight and every other kind of light was rigorously excluded, so far as possible, by means of diaphragms. It was on such a black ground that our colours were viewed. With the exception of this difference, and the fact that we employed the accurate measurement apparatus referred to before, our results in this particular set of experiments were obtained under very much the same general conditions as Aubert's and Von Wittich's. However, we find, as we would expect from the impossibility of the actual duplication of the conditions of colour mixture in the pigment colours, and the exact reproduction of the precise contrast influences at work in the experimentation of Aubert and Von Wittich, that our results differ quite considerably from theirs, just as theirs mutually differ. In the main our results show a lower achromatic threshold than Von Wittich's, and generally quite as low as, or, with a few exceptions, even lower than the findings of Aubert. But the case is different with the chromatic and characteristic colour thresholds, in which we are somewhat higher than Von Wittich and Aubert. For example, Aubert's light thresholds on black ground vary from 1′ 14″ blue (ultramarine) down to 39″ orange, and red at 59″ which are rather low; while Von Wittich's light thresholds on the black ground are never lower than 1′ 4″ and though in that neighbourhood for the most part, yet, in the case of violet, reach as high as 3′ 26″. On the other hand our similar results show a fairly uniform tendency to have the light thresholds within the region between 46″ and 1′ with the exception of yellow and grey which reach 1′ 14″ and 1′ 17″ respectively. In regard to chromatic and characteristic thresholds Aubert has some very low, such as orange and red at 59″ and others that go up as high as 3′ 47″ and 4′ 17″, rose and blue respectively; while Von



Wittich's are mostly lower than 2′, with the exception of dark *blue*, *violet* and dark *green* which are in the neighbourhood of 3′ 26″. Whereas our chromatic thresholds are mostly above 2′, with exceptions such as red and orange which are at 55″ and 48″ respectively, *i.e.*, quite low, just as with Aubert's thresholds for these same. Our characteristic thresholds are frequently as high as 4′ and 5′, especially in the case of *blue* and *violet* and *green*, the same three colours by the way which had highest colour thresholds in Von Wittich's results.

Of the cause of the discrepancies between our results and Von Wittich's and Aubert's it is not difficult to form a feasible opinion from the nature of the conditions under which all three sets of experimental investigations were performed. When we remember the superior accuracy of our measurement apparatus we would ceteris paribus expect our threshold sizes to be somewhat smaller because of that fact. And this may be the reason why our achromatic thresholds are for the most part lower than theirs. But the explanation of the tendency of our chromatic and characteristic thresholds to be higher must be different from this. This seems very probably due in part to the fact that our experiments required choice to be made among a larger number of colours than did Aubert. We used more colours which would have a very effectual tendency to increase the difficulty of deciding which of them any specimen under examination while yet in the doubtful region near the threshold, might be. Accordingly, such an impediment would beyond question, contribute to the raising of our characteristic thresholds. However, this can only be an explanation in part, because, otherwise, we would expect a certain proportionality between the relation of the number of our colours and Von Wittich's and Aubert's, and the relation of the corresponding chromatic and characteristic thresholds of the respective investigations, But in fact we find no such regularity of correspondence between the number of colours used and the increase of the characteristic threshold size when we compare the results of Aubert, Von Wittich and ourselves. For example, Aubert exploits only a few colours, some four representative ordinary colour tones, and some two other commercial colours such as brown, whereas Von Wittich operated upon ten different colours, while we used ten also in our experiments of this kind. Hence, the discrepancy between our chromatic and characteristic thresholds and those of Von Wittich and Aubert cannot be solely due to the numbers of colours among which distinction had to be made, because we find our results prevalently higher than Von Wittich's who employed the same number of colours as we did. And we also find that neither our results nor Von Wittich's stand so much

higher than those of Aubert as the ratio 10:6 might indicate. There was in fact no such regularity.

However, there was in operation another influence which would materially modify the case and have a tendency to produce a comparative increase in the characteristic thresholds for experimentation. Such was the fact that Aubert and Von Wittich both permitted their observers to be aware by the very method of their procedure what colours to expect. The effect of such a mental preparation, undoubtedly, as is well known, would be to lower the point at which the colour could be known as such by counterbalancing that difficulty of decision among the various possible colours which placed our observer's judgment in suspense through a transitional region of no inconsiderable size, until the colour became so definite in its characteristics as to permit no further hesitation in judging it to be one colour tone as against all others. Such taken in connection with the obscure influences which we have noticed in the employment by the different observers of different representative colour pigments which are quite incomparable, and the varying play of contrast influences through the different investigations, will account for the main discrepancies between Von Wittich's and Aubert's and our experiments made under largely the same conditions.

So much for reference to our more carelessly executed experiments which were made solely for the sake of comparison with the results of Aubert and Von Wittich. We will pass on to a brief consideration of some of the results of less inaccurate experiment methods, wherein we secured fairly pure spectral colours and confined the contrast influence within definite channels and to fixed degrees equally distributed over the entire series of colours under investigation. We cannot, of course, give any lengthy discussion of the results in this preliminary paper, but must simply indicate their main trend, referring for fuller information regarding them to their subsequent presentation with tables and diagrams, whereby their significance can be more easily explained and more readily apprehended.

On black ground we obtained some rather interesting results. The light or achromatic thresholds show a quite decided tendency to be lowest in the region around the *blue* and *blue-green* with a slight tendency to be highest in the *red*. On the other hand, the chromatic thresholds though not with perfect unanimity show a tendency to be lowest in the *red* and highest at the other end of the spectrum. This fact is not contrary to what we might be naturally led to expect, because *red* is a colour which emerges as light, no sooner than it is visible

as *coloured*. This peculiar behaviour of *red* taken in connection with the fact that other colours are in minute sizes seen only as uncoloured spots, throws a side light upon component colour theories such as the Young-Helmholtz specimen. We would naturally expect according to this theory that, as the coloured surface became small its influence would be to stimulate only isolated minute areas in the retina, presumably areas so minute as to contain only the one class of nervous elements which respond to one of the original colour components *red*, *green* or *violet* (blue). But we find that this expectation is fulfilled in the case of *red*, and not in the case of *green* and *violet*, which would seem to contradict the theory. Especially is this convincing when we reflect that *green* and *violet* can be seen as *colourless light* of which they are supposed to be constituent elements, at smaller sizes than they can be seen as *green* and *violet*.

Our characteristic thresholds on the black ground displayed a degree of regularity and mutual agreement in tendency among the different observers' results, which was gratifying. They all coincided in having for the lowest space thresholds *red*, *yellow* and *blue* (to blue-green), and for the regions of highest thresholds those about (orange), *orange-yellow*, *yellow-green* and *violet*. The marked correspondence we have graphically presented in curves which will be given with the larger exposition of the problem and results subsequently.

On a grey ground wherein the light contrast influence was to all intents eliminated, we obtained results which, considered relatively, among the various colours with regard to their characteristic space thresholds, were well in agreement with the results obtained upon the absolutely black ground. That is to say, the colours of the lowest characteristic space thresholds were again *red*, the region around *yellow*, and that around *blue* and *blue-green*, while the regions of highest characteristic thresholds were as previously, the *orange*, *green* and *violet*.

It is not permitted us, in the scope of this brief paper, to pause to discuss these results. For this we refer to the paper which will appear later. Meanwhile, all we can do is to call attention to the fact which is noticeable, namely, that the colours which have the highest thresholds on these colourless grounds, are respectively just about the complementaries of those wherein the lowest thresholds obtain. Whether this is significant or insignificant, we cannot here debate, but at any rate, it is a balanced regularity of behaviour which adds a certain æsthetic interest to the findings of our experiments. There is no à priori reason which would lead us to expect that, of themselves, complementary colours,

on a black ground, should counterpoise one another in regard to the angular magnitudes at which they are distinguishable definitely in their proper tones. There is no prima facie ground for supposing that an *orange* and a *blue* of equal intensity as light and subjected to exactly the same environing conditions of colourless light, or absence of light, should display mutually inverse facility in rendering themselves visible as *orange* and *blue* respectively. Hence, that they apparently do so pair off in complementary doubles in regard to the characteristic space threshold, is a noticeable regularity whose explication is not contained analytically in the fact of their being complementary colours.

Our results on a green ground show a very prevalent tendency for the characteristic thresholds to be lowest in the *red* and *yellow* with a lowering somewhat in the *purple*. On the other hand, the regions of highest characteristic thresholds are the *orange*, *orange-yellow*, *yellow-green* and *blue-green*. We would naturally expect that the contrast influence of the green ground would dispose *purple* to have the lowest characteristic colour threshold of all the colours because of the fact that from the most minute surface magnitudes of the colour examined, it is continuously inducing thereupon a more or less influential disposition to purple. However, we find that *red* is the lowest in characteristic threshold, though, in case of one observer, we must state the purple was seen quite as low as the *red*.

But if we consider our results on *blue* and *red* grounds respectively we find a similar phenomenon with much more declared and precise features in contradiction to what we might be disposed to expect.

On the red ground we find an unequivocal unanimous tendency among all the observations for the lowest characteristic threshold to be at the *blue*, and for the colours on both sides in the spectrum to become higher in their characteristic thresholds. The highest mark is reached mainly in the *orange*, *yellow*, *green* and violet, while in the orange-yellow there is a disposition to a lowering though in no case does it reach the low mark of the *blue*. The *blue-green* is for the most part low also. Now it must at once strike us as peculiar that on a *red* ground the blue should be the colour of the lowest spatial threshold. We would naturally expect the blue-green or some of the greens in that neighbourhood to be most easily seen as such and such, and hence to have the smaller threshold because it is the so-called complementary of the red. Being complementary, and therefore having the co-operation of the contrast influence of the red ground to emphasize its peculiar quality of colour we would think it should have a certain primacy over

the others in the facility with which it makes itself known. But the facts are not as we would expect. They are on the contrary arrayed with striking uniformity in flat contradiction of these natural expectations, as is displayed nicely in the curves which we have prepared, but are unable to embody in this paper.

If we consider in connection with this our characteristic threshold results on a *blue* ground, we will find more material for wonder. On the blue ground we find the lowest threshold marks are not in the orange as we might have expected from the complementary relations of *blue* and *orange*, but they are uniformly at the *red*. The next lowest points are respectively *purple* and yellow-green; whereas the highest points are the *orange* and the *blue-green*, and the *green*. It may be noticed that so far from the orange being seen earliest, as we would expect, and at smallest space threshold, it was generally not distinguished as orange at all, even at the fullest opening of the diaphragm apparatus at a visual angle of something in the neighbourhood of 2°. It is from the first called *red*, and remains so generally throughout the subsequent transitions in surface size, quite in violation of our natural supposition, that the orange should be seen easiest on a blue ground. We must note also that not only did the entire range of observations made by many different observers agree in the fact that on the *red* ground *blue*, and on the *blue* ground *red* had the lowest thresholds, but the agreement was striking and uniform to such a degree that the various curves representing the several observers' results came almost to one point (the lowest of all), at the *blue* and *red* in the case respectively of the *red* and *blue* grounds.

In short, it will be noticed, if we consider the blue ground results and *red* ground results together, that *red* and blue act in both cases as we would expect true complementaries should act, viz.: the blue ground seems to facilitate the minute distinguishability of *red* more than the remaining colour elements, and the *red* ground acts similiarly upon the blue. What the significance of this singular phenomenon may be it is perhaps difficult to say, but it seems to indicate, at least, that there is a disturbance of the ordinary complementary relations of the various members of the colour system when the colour surfaces are reduced to small sizes.

Whether such is the case or not we wish to call attention to a very striking coincidence between the facts here disclosed and a similar complementary behaviour of *blue* and *red* in the case of a very remarkable colour blind (dichromate) investigated by Dr. Kirschmann and recorded

in his article "Beitrage für Kenntnisse der Farbenblindheit," in Vol. VIII, of Philos. Studien, p. 199. It was the case of Prof. A., numbered case V, in the forementioned article—a man whose left eye was perfectly normal in its colour sensibility, but whose right eye was colour blind, not by accident or disease, but congenitally. The right eye for this subject was a dichromate, *i.e.* possessed of only two main colours in its colour system, namely, *red* and *blue*, and these behaved throughout for that eye as complementaries, as shown by the after image tests. It is rather a peculiar fact that in the normal eye, as our experiments have shown, for small angular sizes of coloured surfaces the same complementary relation of blue and red appears to obtain, as was evinced in the abnormal eye of Prof. A. Whatever the reason may be accounting for the fact, the coincidence at any rate is somewhat striking, the more so because the peculiar tendencies of the *red* and *blue* were so uniquivocally established so far as our experiments at least were concerned.

It may be noticed in closing this paper that this peculiar behaviour of *blue* and *red* in regard to their characteristic space thresholds when respectively under the other's contrast influence seems to form a serious difficulty to Hering's colour theory which explains all colour phenomena by means of a threefold antagonism of fundamental colour processes in which *black* counterpoises white, *red* counterpoises *green*, and *yellow*, *blue*. This theory would claim that the *red* process which signifies the destruction of nervous elements of a certain kind should originate the green process, both in the recuperation of those same elements and in the neighbouring ones also, which have been disturbed. In other words specifically applied to our apparatus a *red* ground when looked at for the emergence of another colour within its limits as would occur in the central opening of a red coloured diaphragm to permit the entry of other coloured light, should tend to induce upon that element in the red surface a *green* color; because, according to Hering's theory the great activity of those retinal elements stimulated by the red ground, should tend to induce a neighbouring antagonistic activity in the retinal elements which are free from the stimulation of the red ground, namely, those upon which the emerging light of the diaphragm aperture falls. But our experiments show a quite contrary state of things. Instead of the *red* ground inducing the *green*, and the *blue* ground the *orange* or yellow which the Hering theory demands, we actually find as before indicated the *red* ground inducing *blue*, and the *blue* inducing *red* quite in defiance of what that theory pronounces should be. Perhaps the adherents of Hering's theory might be inclined to try to explain the phenomenon by irradiation or what Hering calls

light induction or negative contrast. But such an explanation will not suffice. For it is clear that if the spreading of the red stimulation around the small (aperture) surface counteracts to a certain degree the green induction, what we would expect to issue is not *blue* by any means but *colourless light*, because it is a case of the counteraction of complementaries (red and green), which of course, would produce colourless light. But even if we suppose that the negative induction is not sufficient in degree to completely counteract the positive induction (green), what we would expect from this is a *green* of weakened saturation and not under any circumstances *blue*, as was the case in our experiments. For the influence of the negative contrast would simply be to neutralise the positive colour quality of some of the green induced by the *red* environs, which would, unless a case of complete counteraction where colourless light is the outcome, leave less green light interfused with much grey light produced by the mutual neutralisation of positive and negative inductions, and this is tantamount to saying the result is a *green* of poorer saturation instead of *blue*. So that the question remains over for the Hering theory quite as awkward as ever. Even if we admit the possibility of a gratuitous deviation from that which the theory would lead us to expect and suppose, that in some way or other this negative contrast influence might succeed in producing some other colour result than green, we have yet to explain why it should not as likely be some colour on the *yellow* side of *green*, as one on the *blue* side. We can find no à priori reason for any presumption that the *blue* should obtain the favoured lot of this fortuitous birth. It might just as well be *yellow*, and the fact that *blue* actually obtains is a phenomenon which to our minds has not been and cannot be explained by recourse to negative induction or any such device born of the exigencies of a desperate theory.

In fact, so far as I can see, Hering's theory makes no provision for any such disturbance in the ordinary complementary relationships of the members of our colour system such as the remarkable colour blind case cited seems to demand, and which our space threshold experiments corroborate as possible not merely for abnormal cases but for the normal eye also at small visual angles.*

*Also the very ingenious but somewhat complicated theory of Ebinghaus does not give account of these facts and we may suggest that such a case as Prof. A., where the colour blindness was not only monocular, but where the subject was at the same time an expert opticist—a coincidence which will not frequently occur. —such a case should not be disposed of in the summary way in which Ebinghaus treats it in his article. —Zeitschrift fur Psychologie, Band V, Page 215.

ORDER OF THE COLOURS WITH RESPECT TO CHARACTERISTIC SPACE THRESHOLDS.

(a) ON BLACK GROUND.

Lowest.	*Highest.*	*Medium.*
Red.	(Orange), Orange-Yellow.	Purple.
Yellow.	Yellow-Green.	Green.
Blue and Blue-Green.	*Violet.*	

(b) ON GREY GROUND.

Lowest.	*Highest.*	*Medium.*
Red.	Orange and Orange-Yellow.	Purple.
Yellow.	Yellow-Green and Green.	
Blue and Blue-Green.	Violet.	

(c) ON GREEN GROUND.

Lowest.	*Highest.*	*Medium.*
Red.	Orange-Yellow.	Violet.
Purple.	Yellow-Green.	Blue.
Yellow.	Blue-Green.	

(d) ON BLUE GROUND.

Lowest.	*Highest.*
Red.	Orange.
	Yellow.
Purple.	Orange-Yellow.
	Blue-Green.
	Green.
	Violet.

(e) ON RED GROUND

Lowest.	*Highest.*	*Medium.*
Blue.	Yellow-Green.	Green.
Blue-Green.	Orange.	Orange-Yellow
	Violet.	
	Purple.	

JOSEPH BRANT IN THE AMERICAN REVOLUTION.

By Capt. Ernest Cruikshank.

(Read 3rd April, 1897.)

Among the few remarkable persons known to history, produced by his race, a place in the first rank must naturally be assigned to Joseph Brant as being equally distinguished in the council and in the field. Energetic, brave, and skilled in all the arts and devices of partisan warfare, his numerous expeditions were marked by almost uniform success. A burly and muscular frame and perfect health enabled him to endure extremes of privation and fatigue. His shrewdness and undoubted eloquence and argumentative skill gained him even greater reputation and influence among the whites than with his own people. He possessed the valuable faculty of displaying his talents at all times to the best advantage and impressing nearly every white man he met with perhaps an exaggerated idea of his consequence and ability. From the close of the American Revolution until his death in 1807, he was universally regarded as the most eminent and powerful of his race and was constantly courted and caressed by the officials of both governments and was at the same time equally feared and distrusted by them, as a necessary result of his tortuous and disquieting line of policy. His biography was written at considerable length by Mr. Stone some fifty years ago; but the materials at the disposal of the author were so imperfect that it abounds in errors and misstatements. Quite recently documents have become accessible which render it possible to correct these and construct the narrative of his career on a more secure foundation.

He was born in the year 1742, at the upper Mohawk village of Canajoharie. Sir William Johnson's relations with his sister Mary, induced him to take notice of the young Indian, who displayed at a very early age remarkable readiness in learning to read and write his native language under the instruction of a native Indian schoolmaster maintained in his village by the "Society for the Propagation of the Gospel in Foreign Parts." By Sir William, he was then sent to an English school of reputation at Lebanon, Conn., where

he remained for several years. His marked proficiency in reading and writing English and the aptness he manifested in translating from the various Indian dialects procured him employment as an interpreter in the Indian Department before he reached the age of twenty. In this service it was an easy matter for him to gain distinction, as the majority of his fellow interpreters were rather illiterate and dull-witted men, and and at the same time he secured the warm approbation of successive missionaries by his exemplary conduct as a Christian. The Rev. Samuel Kirkland, a Presbyterian, and later on, a fierce advocate of the revolutionary movement, said "he endeavours to teach his poor brethren the things of God in which his own heart seems much engaged. His house is an asylum for the missionaries in that wilderness." Mr. Stuart, the Church of England missionary, engaged him to translate a large part of the New Testament into Mohawk, as well as the church catechism and a number of sermons, a task which was performed to his satisfaction.

Brant's own tribe, the Mohawks, once the most numerous, always the most warlike and aggressive, had been so diminished by its losses in the late wars with the French that it had become the smallest of the Six Nations, although still regarded as first in rank and reputation. There were now but two small villages known as Canajoharie, or the Upper Mohawk town, and the Lower Mohawk town, containing together barely 400 inhabitants and these were quite surrounded by populous white settlements. There were, in addition, some twenty families, equally isolated, living in the valley of Schoharie.

"Nothing less than manifest injury, in my opinion," Governor Tryon had declared with emphasis, in 1772, "will drive the Mohawks from their steady attachment to His Majesty's interest. They appear to be actuated as a community by principles of rectitude which would do honour to the most civilized nations. Indeed they are in a civilized state and many of them good farmers." Sir William Johnson had been received into this tribe by adoption and had for many years taken a keen interest in its welfare. He founded schools, built churches, and bought black cattle and agricultural implements for its use. There was already a strong strain of white blood in the veins of many of its members and he endeavoured earnestly to strengthen the ties which united the races in every way. The Annual Register for 1767, records the fact that "eighteen young white women have lately been married to as many young Indian chiefs. Sir William Johnson gives all possible encouragement to intermarriage with the Indians which has long been practiced by every nation in America but the English."

The fertile plots of bottom lands occupied by the Mohawks had

greatly increased in value as the white settlements extended, and the land-hunger of their neighbours at length became so powerful that they had recourse to the most shameful expedients to dispossess the Indians. When Tryon received the Mohawks of Canajoharie at Johnson Hall on the occasion of his visit to that part of the valley, Brant, addressing him in their name, said: "We have often been deceived and defrauded of large tracts, but that which at present gives us most concern is the little tract which surrounds us, on which we live, and of which we are now likely to be deprived. It was surveyed one moonlight night and a patent procured for it, by Mr. Livingston, without our knowledge."

The property of the Lower Mohawks was menaced in a very similar manner. The singular old charter of the town of Albany authorized that Corporation to take a thousand acres of land from the Mohawks. This claim had remained in abeyance for half a century, but it was now revived and put forward as a pretext for seizing the very lands they cultivated and had built their dwellings on.

Sir William Johnson's death in 1774 removed the chief barrier against the aggression of the whites. These claims were then pressed with greater vigour, and the Indians became sensible that unless they could secure the intervention of the Crown their prospect of retaining their lands would be slender. They also perceived that as the province became more disturbed and the royal authority grew weaker, the activity of their enemies increased.

Brant had not remained a careless spectator of the fierce revolutionary agitation seething around them and threatening their ruin. His friend, Colonel Daniel Claus, has described his attitude in a highly characteristic passage. "At the commencement of the unhappy disputes between Great Britain and her colonies, he made shrewd and strict enquiries into the reason of the complaints of the Americans, among whom he chiefly resided, and from whom he heard nothing but forging of chains and intended tyranny against them, at the same time seeing no apparent alteration or putting such complaints of tyranny into execution of it, agitated his mind so far as to determine on a voyage to Great Britain in order to try what he could find out there of the matter, plainly foreseeing how much the Indians in general were concerned in such a quarrel, well knowing how ignorant they were as to the disputes in question."

The first trace of actual activity on his part is discovered in a letter written by him in the name of Aaron, John, and another Mohawk chief, in May, 1775, to the chiefs of the Oneidas urging them to come to the assistance of Colonel Guy Johnson, who had succeeded his uncle, Sir

William, as superintendent of the Six Nations. Johnson had been warned of the existence of a plot to carry him away a prisoner to New England, and had hastily summoned a party of Mohawks to his house to protect him. This letter was intercepted and as the Oneidas failed to appear, Colonel Johnson, accompanied by the officers of his department and his faithful body-guard of Mohawks marched rapidly up the valley and disappeared in the recesses of the Indian country. In July, he held a council of the Six Nations at Oswego. This was attended by nearly 1,500 Indians. The superintendent advised them to be faithful to their engagements with the Government and not to molest the inhabitants of the border settlements in any way, but he requested them to guard and keep open the trade-route from Albany to Oswego, and to prevent any interruption of the navigation of the St. Lawrence and Lake Ontario as the only channel by which the garrisons of Niagara and Detroit could be supplied. This they agreed to do, and he selected a small party of picked warriors to accompany him and aid in the defence of Montreal, then threatened from Lake Champlain. Wild and baseless rumours of the sinister designs of the Indians convulsed the frontier settlements with terror after his departure, and in these Brant was constantly named as one of their principal and most active leaders. His share in the short campaign in Canada which followed is not recorded. Claus states that he served faithfully. It seems extremely probable that he was present with other Mohawks at the repulse of the Americans before St. John's, and also at the action on the Island of Montreal in which Ethan Allen was taken prisoner by his nephew Peter Johnson.

In November, 1775, Guy Johnson sailed from Quebec for England, taking with him Joseph Brant, whom he terms in his journal "a faithful young chief," as the representative of the Mohawks of Canajoharie, and his friend John Deseronto, to speak for those of the lower village. On the 28th of February they were presented to the King, at St. James' and according to the Annual Register, "graciously received." On the 14th of March, they had an audience of Lord George Germain, to whom Brant related the tale of the grievances of their tribe. During their stay in England they were shown the Tower and other places of interest, in and about London, by the direction of the Government, and received many attentions from persons of note. Foremost among these were the Earl of Warwick and James Boswell. Brant's portrait was painted by Romney, then at the height of his reputation, and the fashionable artist of the day, at the request of the former, and a sketch of his life was published in the *London Magazine* through the agency of the latter. He found himself one of the lions of the season. We are

informed by Claus, who was in London at the time, that "he made himself acquainted with gentlemen on both sides of the question, soon finding out there was an opinion in favour of the Americans in England, and his penetrating genius soon saw into the motives of that opposition, and plainly discovering that there was no reason of such complaint he was told of in America, and all they and the Americans aimed at was to be sole masters of America, an event so destructive of the liberty of the Inds and their country, and being convinced of the anxiety the Americans for some years showed to dispossess the Inds of the country, had not the Crown interfered. * * * Several gentlemen, of distinction and fortune, took notice of him and used him very kindly, and although some of them were friends of the Americans and argued in their favour, he listened to their arguments with calmness and answered with discretion."

At length, having received a promise from Lord George Germain that the grievances of their people would be redressed, for which they thanked him with due solemnity, and assured him of their attachment, Brant and his companion sailed with Colonel Johnson from Falmouth for New York in the packet *Harriet*, early in June, 1776. During the last three weeks of their voyage (which continued nearly two months), they were repeatedly chased by American privateers and forced out of their course. When near the Bermudas they were overhauled by one of these vessels mounting fourteen six pounders, besides several swivels, and showing a great number of men. The *Harriet* carried only twelve three pounders and was very weakly manned. Colonel Johnson and his officers armed themselves and joined the crew at their quarters. The two Indians having new brass rifles, presented to them by Lord Townshend, distinguished themselves by picking off several persons on board their assailant, whom they supposed, by their dress and actions, to be officers, and after a very hot and close engagement, lasting nearly two hours, the privateer sheered off and sailed away leaving the packet much damaged in masts and rigging, but having only the surgeon of the Indian department and five others wounded. Owing to this, and other disasters, it was not until the 29th of July that they entered the port of New York.

They arrived at a stirring and critical time. On the 2nd of August, Sir William Howe's army landed at the Narrows, nine miles from the city. On the 27th the battle of Long Island was fought, in which Brant took part as a volunteer. By his bravery and skill as a marksman he not only attracted the notice of Earl Percy, who commanded the main body of the British army, but of General Howe himself. On this

occasion the Americans brought a body of Indians into the field some of whom were taken prisoners in the pursuit. Brant entered New York with the victorious army and witnessed the incendiary fires by which one-fourth of the city was laid in ashes.

He had at first formed the project of proceeding up the Hudson as far as Albany; whence he hoped to be able to make his way to the villages of his tribe, which he learned was quite inactive, apparently waiting for instructions or overawed by numbers. He lingered at New York nearly two months longer in the hope that a passage might be opened for him in that direction, but finding then that there appeared to be little prospect of this, he requested General Howe's permission to attempt to penetrate through the enemy's country to the Susquehanna where the nearest villages of the Six Nations were to be found, a distance of more than 200 miles. This would have been a dangerous undertaking for a white man; it was doubly dangerous for an Indian. Although he warmly approved of the service which Brant proposed to render by this daring journey, Howe is said to have given his consent very reluctantly owing to the evident risk attending it. All his instructions were given verbally for fear of capture, and Colonel Johnson authorized him to have a belt of wampum made as soon as he reached his destination, which he was to speak upon and deliver in his name.

It was not until nearly the end of November that Brant left New York accompanied by Captain Gilbert Tice of the Indian Department. They crossed the Hudson at Kingsbridge, adroitly passed the enemy's lines in the dark, and struck directly for the Susquehanna. But as they had a great extent of hostile country to pass through, swarming with patrols and armed parties of the enemy, they were forced to conceal themselves during the day and travel by night only, until they reached the Indian village of Oquago on that river. They were warmly welcomed by the inhabitants to whom Brant was already well known. Upon learning his wishes they almost unanimously agreed to put themselves under his command and act against the Americans. He next went to the Delaware settlement on the west branch of the Susquehanna where he was equally successful. Four days journey then took him to Chenussio Genesee, the first village of the Senecas. Here again he was well received and promised assistance. After a march of three days from Chenussio, he arrived at Fort Niagara which he designed to make his base of operations. From Colonel Butler, the acting Superintendent of the Indians, he met with rather a chilling reception, probably due to the fact that that officer had received peremptory instructions to prevent the Indians from making any attack or committing the slightest

depredation on the frontiers of the revolting colonies, and to employ them solely for purposes of defence. Brant's ardour was not cooled however, for he lost no time in preparing a war-belt of wampum and carried it from village to village and from tribe to tribe throughout the Six Nation Confederacy. Finding that the Oneidas had practically entered into an alliance with Congress, he boldly went to the village of Canaghsoragy near Fort Stanwix, which was inhabited partly by Onondagas and partly by Oneidas, and invited the remainder of the latter tribe to meet him there. Most of them complied, but with evident reluctance and ill-will. As his custom was on such occasions, he told the story of his travels and dwelt upon the power and wealth of England. Then he described the rout of Washington's army which he had witnessed on Long Island, and argued how improbable it was that the rebellion would be successful. The Oneidas however, declared that they were friends both to the King and the colonies, and after an angry discussion the meeting terminated without any definite result. Undaunted by this rebuff, Brant determined even to seek the assistance of those Indians of the Iroquois League, resident at St. Regis and the Lake of Two Mountains, and, as he found it impossible to visit them he sent a written message in which he apparently allowed his zeal to carry him beyond his instructions, and which caused him to fall foul of an unexpected and powerful adversary.

To my brothers the Indians of the Lake of Two Mountains:—

"I am just arrived at Niagara. I acquaint you of this as I intend going down on an expedition this year early in the spring—I expect you will let me know if you will come up and join me. I intend to go with the Indians to deliver my brothers, the Mohawks, from the hands of the rebels, and you may depend upon having your own way of making war. I do not think it right to let my brothers go to war under the command of General Carleton, as General Carleton expects and tries to have the Indians under the same command as the regular troops, but it will be the best method for us to make war in our way. This is my reason for acquainting you that any of you that wish to come up, may come up and join me. This is all I have to say, but I wish your answer as soon as possible."

JOSEPH BRANT.

This letter must have been conveyed to Carleton almost as soon as it was received, and he at once put his foot resolutely upon a movement

so much at variance with his established policy. As early as the 9th of February he wrote to Butler on this subject :—

" I transmit to you the copy of a letter which has been sent to the Indians of the Two Mountains and St. Regis, by Joseph, who is said to have arrived at Niagara, late from New York.

" I beg you will exert every means in your power to stop the Indians of your neighbourhood, as has already been done by those above mentioned, from joining in an enterprise which, besides the inhumanity of it, cannot fail to be attended with consequences very detrimental to His Majesty's interest, and I beg you will use your utmost efforts to engage all the savages of every tribe you can communicate with to join the King's armies early in the spring where they can be supplied with officers and proper persons to direct their efforts to the proper objects, and to prevent the impolicy as well as cruelty of confounding the innocent with the guilty, which must unavoidably result from a war such as is proposed by the letter circulated among the Indians of this country. The force of the savages may be employed under proper management to promote effectively where it is necessary, and this must answer every end of this equally well, while it serves so much better the King's cause."

Addressing Captain Lernoult, the commandant at Niagara, on the same day, he said :—

" However proper and justifiable it may be to make use of the Indians in a defensive war, or to chastize the real criminals, yet true humanity forbids an indiscriminate attack such as is intended by the savages wherein women and children, aged and infirm, the innocent as well as the guilty, will be equally exposed to their fury. I desire therefore, that all means may be used to prevent this, and to turn the force of the Indians to the use which will be most for the King's interest and their own good, by acting in concert with the troops."

Brant spent most of the winter at the Cayuga village in the heart of the country of the Six Nations, animating the Indians and preparing them by every means in his power to take the field early in the spring. But when he returned to Niagara, in high spirits over his success, to procure arms and ammunition, he was amazed and enraged to find not only that he was refused both, but that every obstacle was thrown in the way of his expedition by Colonel Butler and Captain Lernoult, without any explanation being offered. As Carleton's instructions were unknown to them, Butler's conduct was not unnaturally attributed by Brant and

his friends to petty spite or even worse motives. "But here," Claus wrote bitterly soon after: "Jealousy and envy, the monsters of all discord and mischief, showed their heads, and the person who was left there in 1775 by the Superintendent to assist the Commanding Officer at that post in Indian matters was an officer of equal employ with Mr. Brant, only of less importance as to Indian matters and acting in a more servile line, this person having with flattery and cunning (being bred and born in New England), insinuated himself into the favour of Sir Guy Carleton and procuring himself thereon to the office upon the strength of that, lavished immense sums without doing the least service to Government since the beginning of the Rebellion, but allowed the Rebels to establish themselves at Fort Stanwix in the midst of the Six Nation country. This person then imagining to please Sir Guy in slighting and disregarding Sir Wm. Howe, and the Superintendent, besides, apprehensive Mr. Brant should do anything that would expose his inactivity and willing backwardness, received him very cooly and indifferently, although under Superintendent's immediate employ and appointment, having nothing separate from Sir Guy, even denied him the quantity of ammunition he demanded for opposing the Rebels that were assembling again, and he was obliged to purchase what he could get among traders out of his own pocket, and returned very much discouraged from Niagara."

Within a month, information of Brant's successful and alarming activity among the Indians reached the ears of the New York Convention which promptly employed a Colonel Harper, in an attempt to kidnap him. Harper went quietly with a few men to Oquaga on this business but found that Brant was absent on his second visit to Niagara, and the Indians residing there assured him that he intended to settle at the Onondaga Castle on his return.

Whatever disappointment Brant may have felt at Butler's treatment of him, and it was no doubt keen, it did not affect his political sentiments or cause him to relinquish his design of bringing off the remainder of his own tribe from the valley to which they have bequeathed their name. With that intention he collected nearly 200 Indians early in the spring of 1777 and advanced to Unadilla close to the border settlements of New York. General Herkimer at once assembled an armed force of four times that number to bar his further progress. Leaving half of his party in reserve at Cherry Valley, Herkimer advanced into the Indian territory with the remainder and demanded a meeting. Confident of his strength, there seems little reason to doubt that he intended to kill or capture Brant on this occasion and it is said, had specially detailed a

party of men to shoot him when a favourable opportunity offered, but the wily Mohawk was on his guard and his followers were too watchful and well armed for them to risk the attempt. Brant openly declared that "he had taken sides with the King," and even demanded the release of the Rev. John Stuart and Mrs. Butler who were detained by the Americans as hostages. Angry words were soon exchanged with some of Herkimer's officers who had been concerned in the disgraceful plot to deprive his people of their lands; threats were uttered, and, at a sign from their leader the Indians seized their weapons and a conflict was only averted by the hasty retreat of Herkimer and his men.

He then continued his agitation with even greater success than before, for the Indians warmly resented this ill-advised invasion of their country. Writing from New York on the 7th of July, Guy Johnson was able to announce to Lord George Germain that he had received a letter from the Chiefs of the Six Nations "written by Joseph," assuring him that with the exception of the Oneidas they were "ready to act as one man."

Shortly after Herkimer's abortive attempt at coercion, Brant received a message from Colonel Butler, acting under fresh instructions, requiring all the Indians to join him at Oswego to co-operate in an expedition against Fort Stanwix. He obeyed so promptly that he arrived at that place some days in advance of Butler himself, bringing with him not less than 300 warriors. His party was at once pushed forward to support Lieut. Bird who had gone on with a few men to reconnoitre the enemy's position, and the investment of the fort was accomplished with little opposition.

Three days later a message, hurriedly borne by an Indian runner along a bye-path, came from his sister, Molly, who was then living in the Mohawk village of Canajoharie, warning him that a body of nearly a thousand militia, under Herkimer, were on their march to relieve the garrison. Sir John Johnson and Colonel Butler with eighty white men and 400 Indians were detached to meet this force which they waylaid and routed in the woods at Oriskany, a few miles distant. Claus, who was present, said, "Mr. Brant signalized himself highly by advancing on the rebels rear, and harassing their retreat, and making a great slaughter chiefly with spears and lances." The same authority adds that Brant and the Seneca Chief, Sangerachta, were eager to follow up the blow by a descent on the settlements on the Mohawk River, but Colonel St. Leger refused permission from motives of humanity. However, when it was finally determined to raise the siege, he consented that Brant should attempt the execution of his long cherished plan of

delivering the Mohawks in course of a flying march down that historic valley, and then endeavour to join Burgoyne's army which was known to have reached the Hudson River. In carrying out this project, he was obliged to pass around an American army and march for a hundred miles through a hostile country studded with forts. In one skirmish, his favourite companion, Captain John, falling to the rear was surrounded and "being determined not to surrender, had a whole charge of buck-shot fired into his left breast and arm and, notwithstanding, made a miraculous escape." At the lower Mohawk village, they were joined by about a hundred of its inhabitants, after which they continued their hurried flight towards Saratoga. When at length almost within sight of the British camp, Brant "had an encounter with the rebel party which he soon put to flight and arrived safe with Gen. Burgoyne who received and treated him according to his merit."

The arrival of his party is noticed by Anburey when at the Batten Kill on the 24th of August.

"The Mohawk nation," says that author, "which are called Sir William Johnson's Indians, as having their village near his plantation, and who in his lifetime was constantly among them, were driven from their village by the Americans, and have joined our army; they have come with their squaws, children, cattle, horses, and sheep, and are encamped at the creek from whence this place takes its name. When the army cross the river, the squaws and children are to go to Canada and the men to remain."

Like all the other Indians, the Mohawks soon became impatient under the restrictions imposed upon their movements by the presence of so large a regular army, and they deserted Burgoyne some time before the catastrophe of Saratoga.

Claus relates in his "Anecdotes" that Brant "procured encouraging messages from the Canada Indians that remained with Gen. Burgoyne and accordingly attended a general meeting of the whole confederacy at Onondaga where he spared no pains to prepare and harangue them against the shock of Gen. Burgoyne's disaster, of which they soon after had a most exaggerated account from the rebels, the only channel they could get it then, who at the same time with threats invited them to join their cause with a large belt of wampum and a war axe worked in it. However, Mr. Brant, counteracting and using the most urgent arguments such as the loss of brave chiefs and warriors at Fort Stanwix and what subjection and slavery they must be exposed to if the rebels got

the better as their behaviour for many years past clearly pointed out, in which he was joined by his faithful co-adjutor, Sakayenguarghton, the Seneca Chief above mentioned, and in reality carried his point at last so far as to make the whole Confederacy firmly resolve to act most vigourously against the rebels."

Claus was certainly inclined to exaggerate the extent and value of Brant's influence and possibly his statements should be accepted with some reserve. A private letter from a German officer to his family, shows, however, that his movements had become already a topic of common talk in Canada and that he was suspected of entertaining designs scarcely less ambitious than those of the renowned Pontiac whose deeds were still a matter of recent history.

"Now, however, they (the Indians) greatly desire to be independent, and as faithful allies and friends to fight for the King, without being commanded by English generals and officers, and an *Iroke* named Joseph, who has spent some time in England and naturally knows something of the English and savages, desires to achieve for himself a name as chief of an army of Indians. Every means will be tried to prevent this, for God help those colonists who are their near neighbours, should this scheme be carried into effect."

In another place, Claus acknowledges that Brant was ably seconded in his efforts by the tears and prayers of his sister Molly, who had been driven from her home by the enraged Americans soon after the battle of Oriskany.

"She was obliged to leave her home and flee for her children's safety among the Five Nations, where she was assisted by her brothers people, and proceeded to take asylum among the Five Nations, every one of whom pressed her to stay among them, but she fixed upon Cayuga as the centre, and having relations among them, by whom she was kindly received. After General Burgoyne's affair she found them, in general, very fickle and wavering, in particular the head man of the Senecas, called Cayenguarahton, with whom she had a long conversation in council, reminding him of the great friendship between him and the late Sir William Johnson, whose memory she never mentioned without tears which strikes the Indians greatly, and to whom she often heard him declare and engage to live and die a firm friend to the King of England and his friends, with other striking arguments, which had such an effect on this chief and other sachems present that they promised henceforth truthfully to keep up their engagements to her late friend, for she is

considered and deemed by them as his relict, and one word from her goes further with them than a thousand from any white man whatever, who must generally purchase their friendship and influence at a high rate. They desire her advice much more than that of her brother, Joseph, whose zeal and activity rather occasion envy and jealousy with many."

But to Mr. Knox, Secretary to the Committee of the Lords on Trade and Plantations, he wrote of Brant, on the 6th of November, 1777, in terms of unqualified praise.

"Joseph, since his arrival," he said, "has shown himself the most faithful and zealous subject His Majesty can have in America, and deserves to be noticed as such. He is now busy among the Six Nations and has been with them for several weeks past. He is perfectly acquainted with Mr. Butler's sentiments, and disapproves of them, for which the latter dislikes him. I have fully wrote him and given him my opinions and sentiments how to act with the Six Nations, and I am persuaded he will bring them to action before Colonel Butler gets among them."

Before the end of the same month Brant was again at Niagara, and a trusty messenger was sent out on the perilous journey to the British outposts on the Hudson, bearing the following letter from Butler, which after many weary weeks of wandering, he carried safely into New York:

"To Major-General Clinton, Sir William Howe, or officer commanding on Hudson's River.

"SIR,—Joseph and myself are ready to await your orders. We wish to know your situation, and when we can be of use to you and where; we only wish to know the time and place, as we are confident of being well supported; our friends are determined to be so in the worst of times."

A few days later Colonel Bolton informed Haldimand that "Joseph had been of great service and deserved every favour he could show him."

Nothing further is then heard of Brant until the 23rd of January, 1778, when he wrote from Niagara to Claus:

"I shall go from this place to Cayo-Kwen. I intend to remain there during the winter. Twenty odd men go with me from here, and all my particular friends also who are ready to join me through the Nations.

All the Nations are in good spirits and more united now than they have been since the trouble began, except the Oneidas and some few others."

A few days later Butler reported that Brant was then preparing to go to the frontier villages to repel an attack threatened against them from Wyoming. "Mr. Brant," he said, "is very deserving of the character of an active and intelligent man, and very willing to do everything in his power for the public good. * * * He is very deserving of your favour." In the following May he announced that he had detached Brant and Lieut. Barent Frey, of the Rangers, to bring away the remainder of the Mohawks from the "rebel country," after which the Indians meant "to strike in a body." When this was acomplished, Brant returned to his old quarters at Oquaga and Unadilla, where he soon after received a contemptuous message from the inhabitants of Cherry Valley challenging him to leave his fastness in the woods and meet them in the open where they would quickly change him from a "*Brant* into a goose."

The struggle had now become a war of unsparing retaliation. Many loyalists had been plundered of everything they possessed, and driven into the woods to perish or find their way in a starving condition to the nearest British post. Nameless indignities had been practised even upon their helpless women and children. Those who survived, burned for revenge, and opportunities were not long wanting.

Brant replied to the taunt by leading a foray, not upon Cherry Valley, but upon the more distant and seemingly secure settlements on the Cobus Kill and Schoharie River, while Butler was at the same time engaged in his famous raid upon Wyoming. Accounts of his movements are rather vague and incoherent. Several American writers mention the disastrous defeat of two detachments of their troops with the usual circumstances of surprise and ambuscade, followed by the distruction of several outlying hamlets, and name Barent Frey as still being associated with Brant in command of the Indians. Brant's own account does not appear to have been preserved, and Butler, possibly owing to the agonizing disease which drove him to seek relief at Niagara, did not allude to his operations in detail. Guy Johnson and Claus agreed in considering them very important. Johnson said in a despatch to Lord George Germain, "Another division under Mr. Brant cut off 294 men near Schoharie and destroyed the adjacent settlements with several magazines, from whence the rebels derived great resources, thereby affording encouragement and opportunity for many of the friends of the government to join them." Claus enters into further detail, and is even

more emphatic in his praise. "Mr. Brant opened the campaign by attacking a party of Continental troops, joined by nearly 300 militia, who immediately were put to flight, and the Continental troops cut to pieces all but an officer and four privates taken prisoners, and the country laid waste, distinguishing at the settlement of loyalists, and not molesting a woman or child of the rebels. This occasioned such an alarm that all the inhabitants farther down the river fled towards Schenectady and the rebels were obliged to send several battalions to oppose Mr. Brant's operations, and the harvest about Schenectady, Cherry Valley, and adjacent places being thereby neglected, proved very detrimental to the supplies of the rebel army, that being the best grain country they depend upon; and, in short, Mr. Brant was the dread and terror of the whole country."

Even General Haldimand, lately appointed to succeed Carleton as Governor-General of Canada, who was ordinarily reserved in his judgments, expressed warm approbation. "Butler's success in harassing the enemy," he said, "must be greatly attributed to the Indian, Joseph Brant, whose attachment to government, resolution, and personal exertions makes him a character of a very distinguished kind, and I humbly consider him entitled to some particular mark of the King's favour."

In August, Butler states that Brant was again at Oquaga with Captain Caldwell, whom he had left in command of his rangers, engaged in scouting towards the Delaware River, "as low as the Minnesinks and Schoharie, as well to annoy the enemy as to gain intelligence." None of Butler's letters indicate the least trace of that pronounced dislike towards the ambitious young Indian which Claus attributes to him; on the contrary he constantly refers to him in terms of the frankest approval. Thus, a few weeks later, he informed Haldimand that "Mr. Joseph Brant, whose activity during the summer is really deserving of praise, stayed at Aughquaga with Captain Caldwell, where he has not only been very attentive and vigilant, but at the same time, from his perfect knowledge of the country, particularly serviceable in directing the routes of their parties who are constantly moving about and alarming the enemy's frontier."

He next accompanied Caldwell in a raid on Burnetsfield, at the German Flats, which resulted in the ruthless devastation of a rich tract of country for ten miles on either side of the Mohawk River. They rushed upon that place in the grey light of a September morning, hoping to surprise the forts which were known to be well garrisoned. There was little bloodshed, as the inhabitants had been warned of their approach,

and had taken shelter within those posts, whence they watched their blazing homesteads with impotent fury. The harvest had been wonderfully abundant, and the barns were bursting with grain. The church was the only building spared. A number of large New England oxen were taken from the cattle-pens within pistol-shot of Fort Dayton, where they were kept for the use of its garrison, and with the cattle of the settlement, were carried off in one huge drove.

A newspaper of the time relates that sixty-three dwellings, fifty-seven barns, three grist-mills and two sawmills were burnt, and that 235 horses, 229 horned cattle, 269 sheep, and ninety-three oxen were driven away.

With truly astonishing activity, Brant appears a month later as the leader of an expedition towards Minnesink, more than a hundred miles distant in another direction. Our knowledge of this foray is entirely derived from a letter addressed by Taylor and Duffin, merchants at Niagara, to Colonel Claus. It says: "Brant wrote to Pollard on the 25th of October, that with about eighty white people, and with but a few Indians, he marched to Pick Pus, a very pretty, small settlement, where the rebels had three forts, one of which he took, and demolished, and all the houses. He took six prisoners, two of them officers, and killed six. He surrounded the other two forts, but his ammunition being nearly exhausted he was obliged to come away and leave; all the rivers being high, and he thought as he proposed joining Captain Butler to see the last service this season theywould retard him too much. He complained much of Captain Butler's usage of him, and thought of quitting him and going to Canada, but the Indians would not hear of it, and asked did he not know Captain Butler had command of the Rangers only. He had cheerfully complied to attack Cherry Valley."

This last mentioned place had been from the first a hot bed of revolutionary feeling, and it is probable that Brant had not forgotten the insults offered to him by its inhabitants, for an Indian has a long memory. As soon as he returned, Walter Butler, who had superseded Caldwell in command of the Rangers, began his march with 200 men of that corps, a few volunteers from the 8th, and 321 Indians. The garrison of the place he was about to attack had been ascertained to consist of 300 Continentals from Massachusetts and 150 local militia. The Continentals occupied a stout log fort, and had been warned of impending danger by friendly Indians. By a forced march, during a stormy night, Butler gained the outskirts of the settlement unperceived, and at break of day rushed upon the fort and barracks. The principal

officers and about thirty privates of the Continentals were killed or taken in their quarters, besides many of the militia. The remainder scurried into the fort and hurriedly shut the gates upon their pursuers. A block-house close by was taken and burnt, but it was useless to attack the fort itself without artillery.

With mingled dismay and horror Butler then beheld many of the Indians break away from their officers and disperse in all directions, killing numbers of the miserable inhabitants and plundering and burning their houses. This wretched misconduct forced him to draw together his little party of white troops to overawe and hold in check the exasperated garrison, who, by a bold sally, might easily have revenged all their losses. Seizing a spot of high ground near the fort, he was obliged to remain on guard the whole day, exposed to a ceaseless, chilling rain, while revolting scenes of slaughter were being enacted in the settlement around. When night at length descended upon this dismal tragedy, Butler retired a mile and rescued some of the survivors, who were placed under a strong guard to protect them. Already most of the buildings throughout the length and breadth of the valley had been destroyed and many cattle killed or driven off. In the morning Captain John Macdonnell (afterwards the first speaker of the Legislative Assembly of Upper Canada), with a party of Rangers, and Brant with fifty Indians, returned to complete the work of desolation, covered by Butler himself, with the main body of the Rangers, while the remainder of the Indians were sent away in disgrace.

"I have much to lament," Butler frankly admitted, in his report to Colonel Bolton, "that notwithstanding my utmost precautions and endeavours to save the women and children, I could not prevent some of them falling victims to the fury of the savages. They have carried off many of the inhabitants and killed more, among them Colin Cloyd, a very violent rebel. I could not prevail on the Indians to leave the women and children behind, though the second morning Captain Johnson (to whose knowledge of the Indians, and address in managing them, I am much indebted), and I got them to permit twelve who were loyalists, and whom I had concealed, with the humane assistance of Mr. Joseph Brant and Captain Jacobs, of Ochquaga, to return. The death of the women and children on this occasion may, I believe, be truly ascribed to the rebels having falsely accused the Indians of cruelty at Wyoming. This has much exasperated them, and they were still more incensed at finding that the colonel, and those who had then laid down their arms, soon after marching into their country intending to destroy their villages, and they declared they would be no more falsely accused

of fighting the enemy twice, meaning they would in future give no quarter."*

During the following winter Brant visited Quebec where he was warmly received by General Haldimand. The meeting in no way diminished the very favourable opinion the Governor had previously formed of his talents and services, and Brant on his part appeared very much affected by the marks of attention he received. But he had not yet forgiven Butler for thwarting his original scheme of uniting the Indians under his leadership and seemed discontented and reluctant to serve any longer under his directions. Real or fancied slights to which he had been subjected still rankled in his mind. The assistance and advice he had received from Claus, he said, had alone enabled him to perform whatever service he had rendered, when the "jealousy and envy" of his enemies were throwing obstacles in the way. Mindful of "his good character and faithful disposition," Haldimand suavely urged him to forget past disappointments, and in April Brant set out on his return to Niagara in company with Captain Brehm, the Governor's aide de camp.

Haldimand's recommendation, already cited, in conjunction with frequent mention of his services in letters from Claus and Johnson caused the Ministry to decide upon a quite unexpected, and in fact highly embarrassing, mode of rewarding them which Lord George Germain announced in a letter of the 10th of April, 1779.

"The astonishing activity and success of Joseph Brant's enterprises and the important consequences with which they have been attended, give him a claim to every mark of our regard, and which you think will be pleasing to him, what has occurred to me as most likely to gratify him has been done, and enclosed herewith you will receive a commission signed by his Majesty appointing him a Colonel of the Indians, and on board the Three Brothers storeship is a box with prints taken from Lord Warwick's picture of him which he was particularly pleased with, some of which you will send into his nation and dispose of the others as you think most honourable for him as a memorial of his services."

---

*A poet of the present day has unconsciously paraphrased these words of the Indians:

"Let us rest to-morrow, fellows, since to-day we have fought amain;
Let not these men we have smitten come back on our hands again,
And say, 'Ye Wolfing warriors, ye have done your work but ill,
Fall to it now and do it again, like a craftsman who learneth his skill.'"

—*William Morris, The House of the Wolfings.*

This despatch was not received by Haldimand before the second week of September when he promptly replied with characteristic shrewdness and penetration, "I have received his Majesty's commission for Joseph Brant and Your Lordship observes very justly that his conduct merits every mark of our attention and regard, but Joseph's situation amongst the Six Nations is very different from the idea those who are not acquainted with it, must, from his superior talents, conceive. To speak in their style, he has been very lately known on the war path. He is now distinguishing himself in that line, but it will be some time before he is acknowledged by them even upon a footing with very many (as they conceive), more experienced and greater warriors, besides the notice that has been taken of him by us, in consequence of his connection with Sir William Johnson, his being civilized, and now particularly for his good services, has from a jealousy paramount in the Indians, procured him as many enemies of his own people as friends. Amongst this number is Schenderachto, King of the Senecas, and by many degrees, the most leading, and the man of the most influence in the whole of the Six Nations, and by whose interest and intrigues, Major Butler has been able to carry through many essential points. He is brave, prudent, and perfectly attached to Government, more willingly so since the alliance with the French, to whom he has a most unconquerable aversion. Were so great a mark of distinction, as is proposed for Joseph, to pass him, it might, and I am sure it would, be productive of very dangerous consequences, for which reason, I must take it upon me to suppress the commission and likewise the pictures until I have His Majesty's further pleasure. I should hope this affair has not been so publicly mentioned at home as to reach Joseph's knowledge, which from the part I find necessary to adopt, would equally prejudice the service.

"Every favour and attention in my power, Joseph has experienced, and always shall, but, for the above reasons, I am obliged to do it with address. His sister, who lived many years with Sir William Johnson, by whom he had many children, and to whose influence he was much indebted in his successful management of the Six Nations, was driven from her home and took refuge at Niagara. Her situation there not being as comfortable as could be wished, she brought her family to Montreal by my desire where I settled her to her satisfaction; but upon hearing of the rebels advancing into the Indian country, thinking she might be of use in encouraging the Indians to preserve their fidelity, she returned to Niagara."

At Carleton Island, Brant was overtaken by Walter Butler also returning to Niagara from Quebec. Thanks to the Governor's soothing

speeches, they now greeted each other with a show of cordiality. There too, Brant learned with much distress that the Americans had burned the Onondaga village and carried off one of his children among their prisoners. This did not, however, diminish his zeal, for as soon as he arrived at Niagara, he volunteered to accompany Captain Butler to Detroit in the hope of inspiriting the western Indians to rally for the defence of that place. They were already upon their way to Fort Erie where they intended to embark in a sailing vessel, when they encountered a runner bearing the alarming intelligence that the enemy was advancing against the Cayuga village. Brant hurried off to the assistance of his friends, but on learning that it was a false alarm, made a rapid march through the woods to Venango and Pittsburg where an expedition against Detroit was reported to be in preparation. Having accomplished his object of alarming the American garrisons in that quarter, he wheeled sharply about and taking a wide circuit through the country returned to his former post of observation at Oquaga. A formidable army was then assembling at Wyoming with the evident intention of invading the Indian country, and another was reported to be forming at Otsego Lake for the same purpose. Butler with 300 rangers was watching their movements from the Indian village of Canadasaga. The Indians themselves were starving and Butler's men were living on salted provisions brought from England. In the hope of diverting the attention of the enemy to the defence of their own frontier and at the same time obtaining cattle for the subsistence of his followers, Butler sent one party under Captain Macdonnell to attack the settlements on the west branch of the Susquehanna while Brant with another was simultaneously instructed to descend the Delaware as far as Minnesink.

On the 29th of July, the latter was back at Oquaga where he penned this direct and modest account of his incursion which had terminated in a sharp encounter with a pursuing force:

"I arrived here last night from Minnesink, and I was a good deal disappointed, I could not get into that place a little before day as I wished to do, I did not arrive till noon, when all the cattle were in the woods, so we could get very few of them. We have burnt all the settlement called Minnesink except one fort, which we lay before about an hour and had one man killed and one wounded. We destroyed several small stockades and forts and took four scalps and three prisoners, but did not in the least injure women and children. The reason we could not take any more of them was owing to the many forts about the place into

which they were always ready to run like ground-hogs. I left this place about 8 o'clock next day and marched fifteen miles. There are two roads, one through the woods, the other along the river. We were coming up this way the next morning, and I sent two men to examine the other road, the only way the rebels could come to attack us. These men discovered the enemy's path, not far from our camp, and discovered they had got before us to lay in ambush. These two rascals were afraid when they saw the path, and did not return to inform us, so that the rebels had fair play at us. They fired at the front of our people when crossing the river. I was then about four hundred yards in the rear. As soon as the firing began, I immediately marched up a hill in their rear with forty men, and came round on their backs. The rest of my men were all scattered on the other side; however, the rebels soon retreated, and I pursued them until they stopped upon a rocky hill round which we were employed, and very busy, for nearly four hours before we could drive them out. We have taken forty odd scalps and one prisoner, a captain. I suppose the enemy have lost near half their men and most of their officers; they all belonged to the militia and were about 150 in number. I have sent my party to Shimong to remain till I join; I am now setting off with eight men to the Mohawk River in order to discover the enemy's motions. In the last skirmish we had three killed and ten wounded. John, the Mohawk, is dangerously wounded, and three more nearly as bad."

American accounts corroborate Brant's in every essential particular. His party is stated to have consisted of sixty Indians and twenty-seven Rangers. The pursuers originally numbered 150, and were joined on the march by a few more. Two colonels and many officers of lesser rank were among the killed, and of the entire force not more than thirty are said to have escaped from that disastrous field.

This desperate struggle occurred at a ford near the mouth of the Lackawaxen branch of the Delaware on the 22nd of July. On the 2nd of August, with his usual celerity of movement, Brant appeared unexpectedly on the Mohawk, at the head of his small scouting party, took a few prisoners, alarmed the inhabitants, and disappeared.

On his return he wrote to Colonel Bolton, at Niagara: "After I took the two prisoners, the militia followed me, and in time came up, when I received a wound in my foot by a buckshot, but of no consequence, and am now almost as well as ever. However, I took care to bring off my prisoners. * * * I am a little afraid we shall have hard work to

drive the enemy back, for our friends are too slow in joining us. H
ever, most of the chief warriors are in high spirits and not discoura
they think we shall beat the enemy provided they soon all asse
here in time. * * * I request you will drive all the Indians
Niagara and not suffer a man of them to go to Canada."

THE GAMETOPHYTE OF BOTRYCHIUM VIRGINIANUM.

By Edward C. Jeffrey, B.A.,

*Lecturer in Botany, University of Toronto.**

(Read 21st November, 1897).

I.

On account of their subterranean and inconspicuous prothallus and the slow germination of their spores, the literature on the subject of the sexual generation of the *Ophioglossaceæ* is somewhat scanty.

ERRATA.

Instead of "latter" in 19th. line of page 268. read "former."
Instead of "*phlegmaria*" in 29th. line of page 268. read "*Phlegmaria.*"
Instead of "Rhabenhorst" in foot-note of page 274. read "Rabenhorst."
Instead of "*phlegmaria*" in 17th. line of page 276. read "*Phlegmaria.*"
Instead of "hypobasal" in 3rd. line of page 290. read "epibasal."
Figures 7, 8, 9, 10, 11, 12, 13 and 14 are all lithographed from photographs.

sporophyte appeared on the lower surface of the prothallus. The root grew out first, indeed two roots often made their appearance, before the first leaf became visible. The latter was bract-like and colourless. The two following leaves resembled it, but they had, either one or both of them, green tips. The fourth frond conformed to the usual type, and probably made its appearance in the next period of vegetation. From the situation of the embryo on the lower surface of the prothallus, the

* Most of the material for this investigation was secured by means of a grant from the Elizabeth Thompson Scientific Fund.

1. Abhand. d k. Sächs. Gesellschaft d. Wissch. Bd. ii., pp. 657-662.

THE GAMETOPHYTE OF BOTRYCHIUM VIRGINIANUM.

BY EDWARD C. JEFFREY, B.A.,

*Lecturer in Botany, University of Toronto.**

(Read 21st November, 1897).

I.

ON account of their subterranean and inconspicuous prothallus and the slow germination of their spores, the literature on the subject of the sexual generation of the *Ophioglossaceæ* is somewhat scanty.

Hofmeister[1] was the first to give an account of the gametophyte in this group. His friend Irmisch sent him specimens of the very young sporophyte of *Botrychium Lunaria* in 1854. On visiting the spot where the young plants had been discovered, he found other examples, some of which were still attached to the maternal prothallus. The latter, he describes as being oval in shape and about a millimetre in length, of light brown colour externally, and yellowish white in section. The cells were filled with clumps of material not of a starchy nature. *Antheridia* were found mainly on the upper surface, the *archegonia* being situated below. Root-hairs were sparingly interspersed among the sexual organs. The antherozoids resembled those of the other *Filicineæ*, but were about one-half larger in size. The *archegonia* were sunk almost level with the surface of the gametophyte. One prothallus was found still attached to its spore, but attempts to germinate other spores, under observation, were unsuccessful. No young embryos were obtained, nor was it possible to study the development of the sexual organs. As a result of the inferior position of the *archegonia*, the young sporophyte appeared on the lower surface of the prothallus. The root grew out first, indeed two roots often made their appearance, before the first leaf became visible. The latter was bract-like and colourless. The two following leaves resembled it, but they had, either one or both of them, green tips. The fourth frond conformed to the usual type, and probably made its appearance in the next period of vegetation. From the situation of the embryo on the lower surface of the prothallus, the

* Most of the material for this investigation was secured by means of a grant from the Elizabeth Thompson Scientific Fund.

1. Abhand. d k. Sächs. Gesellschaft d. Wissch. Bd. ii., pp. 657-662.

growing shoot was forced to make a half turn to assume its normal, negatively geotropic position.

In 1856, Mettenius[2] published an account of the sexual phase of *Ophioglossum pedunculosum*, which he found in considerable quantities, in the earth of the pots containing the adult spore-plants. Attempts to germinate the spores, under observation, failed also in this case. The youngest prothallia were tuber-like in shape, and one to three millimetres in thickness. Out of the tuber grew subsequently a conical process which elongated considerably (four to fifty millimetres), and sometimes branched. At the tip of the outgrowth, or of its ramifications, was found an apical cell, sometimes at least, of triangular pyramidal shape. The cylindrical portion of the prothallus grew upwards towards the surface of the soil, but, on reaching the light, became green and died away at the apex, or divided into two or three lobes which flattened out on the earth and developed no further. The tuber was composed of starch-laden parenchyma. In the process some textural differentiation was found, there being an axial, elongated, starch-free strand, surrounded by short starch-bearing cells. Both kinds of sexual organs were found in the same plant and not arranged in any definite order, but generally situated on the cylindrical process. The *antheridia* were large in size and their wall was generally two layers of cells in thickness. The antherozoids were large also, and composed of one and a-half to two spiral turns. The *antheridium* opened by a pore produced by the breaking away of two superimposed cells in its wall. The aperture was generally situated in that part of the wall nearest the apex of the prothallium. The spermatozoids swarmed out of the mother cells and about in the cavity of the *antheridium* before making their way out. The *archegonia* originated from two superficial cells, the upper of which gave rise by repeated divisions to a neck of three to five tiers of cells; the lower formed the axial row, which were not, however, made out individually by this writer. On account of the small number of embryos found, it was impossible to follow stage by stage, their development. Nothing was noted in regard to the formation of the first dividing walls. The youngest embryo was oval in shape and already segmented into a number of cells. The older ones were similar in configuration, but of larger size. The anterior end of the elliptical embryo grew through the tissues of the prothallium towards its apex, and bursting forth sooner or later, became the cotyledon, green in colour, and lanceolate in outline. The root developed more slowly and bored its way directly outwards. A rounded protuberance at the

2. Filices Horti Botanici Lipsiensis, pp. 119-120.

junction of the cotyledon and root, probably the foot, fastened the young sporophyte to the base of the *archegonium*. The apical bud appeared sometimes at the point of union of root and leaf, and sometimes further down on the root, thus simulating the adventitious buds arising from the roots of the adult plant.

The most recent contributions to our knowledge of this group is due to the discovery of the gametophyte of *Botrychium virginianum* by Professor Douglas Campbell[3] at Grosse Isle, Michigan, in 1893. The prothallia were unfortunately, like those of Hofmeister's *Botrychium Lunaria*, which they resembled in appearance, although larger in size, too old for the study of the development of the sexual organs and embryo. They are described as being flattened tubers with folded upper margins, covered with root-hairs and bearing the reproductive organs on the superior surface. Brown externally, white in section, the lower part of the gametophyte harboured an endophytic fungus. The *archegonia* had rather long and straight necks, while the *antheridia* were quite endogenous like those of *Equisetum* and *Marattia*. No young embryos were found, but only advanced young sporophytes, bearing already the first or a subsequent leaf.

Professor Campbell was the first to bring about the germination of the spores in this group. The process is exceedingly slow, requiring, even in the warm climate of California, for *Botrychium virginianum*, eighteen months or more, and for *Ophioglossum pendulum*, somewhat less than that time. The most advanced stages yet obtained by him, had only undergone two or three divisions. Chlorophyll was found in the young prothallium of *Botrychium virginianum*, and a suspicion of chlorophyll in that of *Ophioglossum pendulum*. This may have been due merely to the fact that germination took place in the light.

As there has been a tendency in recent years to associate the *Ophioglosseæ* with the isosporous *Lycopodineæ*, it is necessary to state briefly what is at present known concerning the gametophyte in the latter group. Fankhauser[4] discovered in 1872 the brown subterranean prothallus of *Lycopodium annotinum*. The examples found by him were lobed, tuber-like, and marked by numerous ridges and depressions. *Antheridia* and fully formed sporophytes were found on them, hence the prothallia must have been monœcious. In 1884, Bruchmann[5] found some much younger prothallia. These were of oval and flattened form,

3. Trans. British Association, Oxford Meeting, 1894. Structure of Mosses and Ferns, 1895, pp. 224-228

4. Bot. Zeitung. 1873. No. 1.

5. Bot. Centralblatt. Bd. i., 1885, pp. 23-28.

the superior margin being raised so as to produce a depression in the centre. The *antheridia* occupied ridges in the bottom of this basin. No *archegonia* were present, nor did the plants show a definite apical meristem. The same observer remarked that the inferior cells of the prothallus were occupied by an apparently symbiotic fungus, the *mycelium* of which communicated with the outside by means of the root-hairs with which the plants was provided. He referred the symbiont to the genus *Pythium*. More recently Treub[6] has published a description of the prothallium of *Lycopodium cernuum*. Here the gametophyte, as in *Ophioglossum pedunculosum*, starts from a primary tubercule, and divides subsequently into green lobes. The sexual organs have no definite arrangement and are monœcious. The *archegonia* possess a single uninucleate canal-cell. The large *antheridia* have a single-layered outer wall and produce biciliate moss-like antherozoids. The embryo is peculiar in the possession of a rudimentary suspensor. The stem in the young sporophyte is at first represented by a parenchymatous mass which has been designated the primary tubercule. The first division in the embryo is transverse and gives rise to the epibasal and hypobasal cells. The latter originates first the cotyledon; the stem-apex apparently not developing till after several leaves have grown out. The first root also is derived from this segment, but only after a number of foliar organs have unfolded. The prothallus in this case was likewise occupied by a symbiotic fungus, which was considered by the author to be a species of *Pythium*.

Goebel[7] about the same time described the sexual phase of another species, *Lycopodium inundatum*. It closely resembled *Lycopodium cernuum* in structure, and also harboured a fungus resembling *Pythium*. Treub[8] has also published an account of another form, viz: *Lycopodium phlegmaria* which is slender, much branched, and entirely subterranean. It is especially interesting on account of the occurrence of a number of canal-cells in the *archegonium* and from the presence of paraphysis-like growths among the *antheridia*.

II.

In 1895, the writer came upon a large number of prothallia of *Botrychium virginianum* in a Sphagnum-swamp behind the village of Little Metis, in the Province of Quebec. The presence of these plants was revealed by the greenish-yellow cotyledons appearing above the surface

6. Etudes sur les Lycopodiacées. Annales du Jardin botanique de Buitenzorg. Tome iv., v., vii. viii., 1884-1890.

7. Bot. Zeitung. 1887. No. 11-12.

8. Op. Cit.

of a slight depression in the moss. On removing some of the overlying vegetation, numbers of the larger prothallia were easily obtained. It required, however, careful sorting of the peaty soil with the fingers to secure the younger and more interesting stages. Nearly a week was spent in working over about half the bed, the result being several hundred examples in all stages of development, of the gametophyte and attached sporophyte. Subsequently, in another season, a week was spent on the spot, and all the plants which careful sifting of the soil would yield, were removed. The second harvest amounted to over six hundred specimens, by far the larger number of which, however, were much too old for study. During the same summer, other and older plants were found in rich woods about two miles back of Metis. In the spring of 1896, additional discoveries were made in Foster's Flats, below the Whirpool, on the Niagara River, and on the east branch of the river Don, a few miles from Toronto. The last mentioned spot proved rich in interesting examples of older stages of the attached sporophyte. Most of these were removed last autumn (1897).

III.

One of the greatest difficulties in the way of the present research, was the proper preservation of the prothallia. They are singularly impermeable to fixing reagents on account of the thick external cuticle, and must be cut at intervals with a razor, to allow the preserving medium to penetrate. The presence of oil in large quantities in the tissues, also renders aqueous fluids useless, as they scarcely make their way in at all. A saturated solution of picric acid in thirty per cent. alcohol, gave fairly good results; but the best fixation was obtained by using a mixture of three parts of a saturated solution of corrosive sublimate in ninety per cent. alcohol, and one part of saturated solution of picric acid in the same menstruum, diluted with distilled water to reduce the alcohol to thirty per cent. strength. The same reasons which rendered the material hard to preserve, made it difficult to embed. Paraffine was mainly used, and the most satisfying results were obtained by infiltrating with benzole, in a vertical tubular dialyzer with a chamois leather diaphragm, revolved slowly by means of clockwork. It was found that the ordinary type of stationary dialyzer was quite unsuitable for these very delicate objects. When the prothallia in alcohol were placed in the top compartment, and the benzole below, the osmosis was exceedingly slow; and, if the position of the media was reversed, the weight of the benzole carried it through too rapidly, and injurious shrinkage was the result. The continued reversing of the

relative positions of the two liquids by the clock movement, and the accompanying agitation, were found to overcome these inconveniences. Unfortunately, this device was hit upon only after numerous experiments, and when the investigation was almost completed. The transference from benzole to paraffine was effected in a stationary dialyzer, or by evaporating off the benzole in a water-bath, from a ten per cent. solution of paraffine in benzole. Celloidin embedding has also great advantages, but as the material has to be cut into slices not thicker than two millimetres at most, and as the prothallia were often nearly twenty millimeters in length, it was only employed for sections through certain regions of the gametophyte, and for the much less impenetrable young sporophyte. The stains chiefly used were either a combination of alum-cochineal and eosin, or aqueous saffranin, made by dropping a small amount of saturated alcoholic solution of equal parts of Grübler's alcohol and water soluble saffranins. This last method seems worthy of a wider application.

IV.

The youngest prothallia obtained were already two millimetres in length by one and a-half in breadth. As may be seen from figure 1, they are of flattened oval shape, and covered with hairs. The growing point is at the narrow thin end, and the prothallium thickens and widens from thence backwards. *Antheridia* alone are found at this stage, and are entirely confined to the upper surface of the gametophyte. They form a cluster at the older end, but thin out into a narrow median row as they extend forward towards the growing point, figure 1, *ar.* In somewhat larger and older plants, the median row of *antheridia* is raised on the crest of a distinct ridge, and the *archegonia* begin to make their appearance upon its sides, figure 2. The antheridial ridge is a marked feature of most of the older prothallia, and must have the same significance in the process of fertilization as the inferior archegonial prominence possesses in the leptosporangiate *Filicineæ*. In more mature individuals the ridge is obliterated, especially in the posterior region of the prothallus, by the more rapid growth of the sides of the latter, which seems to be a provision for the nourishment of the fertilized *archegonia*. This phenomenon probably is the cause of the antheridial ridge not being noticed by Campbell [9]. Figure 3 shows a plant in which an embryo, *em.*, has already reached a considerable size. The antheridial prominence is still very marked; the root-hairs, however, have largely disappeared. In figure 5, we have a somewhat younger stage with the rhizoids still abundantly present, especially in the

9. Op. Cit.

younger anterior region of the prothallus. Figure 4 is of a lobed gametophyte; figure 6 shows a similar condition in which two embryos, *em.* 1, *em.* 2, are to be seen. The depression of the antheridial ridge in the posterior region by marginal growth is particularly well-marked. These lobed forms are quite abundant among the Metis specimens, but the Toronto plants did not manifest this peculiarity. I am inclined to believe that the conditions of life in the two cases may have been the cause of this difference. The Metis specimens were found in wet, peaty soil. The Toronto plants, on the contrary, grew in rich, yet rather dry, forest mould. Older lobed prothallia have almost invariably two sporophytes attached to them. In figure 7, is represented an example in which the first root of the young sporophyte has reached a considerable size. At this stage the axis of the young sporophyte, which, in earlier phases, is nearly always at right angles to that of the prothallus, becomes often more or less oblique, as in the example figured. This rotation of the axis is probably due to the continued growth of the prothallium after the formation of the embryo. Figure 8 shows a prothallium in which two roots of the attached sporophyte have grown to a considerable length, although the cotyledon is short and still unfolded. In figure 9, we have a small gametophyte with only one root, and yet having the cotyledon fully expanded. The first leaf may expand either after one, two, or three roots have been formed, according to the vigor of the plant, and may always be recognized by its seeming to grow out of the proximal end of the first and stoutest root. Figure 10, is of a strong plant with three precotyledonary roots. The lamina of the cotyledon is not bilaterally symmetrical, as in most of the *Filicineæ*, but of the palmate type represented by *Ophioglossum pedunculosum*. As may be seen from figures 9 and 10, the first leaf varies considerably in complexity in accordance with the greater or less robustness of the plant from which it originates. In the next drawing, figure 11, is represented a lobed prothallium, on which are two older sporeplants, deprived of the leaves of the year of their collection. Figure 12 shows a Toronto specimen, bearing two well-advanced sporophytes. Figure 13 is a representation of a bifurcated sporeplant, two examples of which have been found. Figure 14 is interesting, for it represents a sporophyte which has already developed the fertile ventral segment, and is yet still attached to the mother prothallium. The sporeplant in this case is eight years old, as indicated by the number of foliar lacunæ in the fibro-vascular cylinder. There seems to be little danger of error in drawing this inference, for a considerable acquaintance with the young sporophyte enables me to state positively, that never more than one leaf is developed at a time, and in all

probability, only one in a year. Attached sporophytes, five or six years old, are sufficiently common, as has been already stated in the preliminary notice.[10]

The prothallia described in the foregoing account were from two to twenty millimetres in length, and from one and a-half to fifteen millimetres in breadth. The gametophyte of *B. virginianum* is thus considerably larger than any geophilous prothallus which has yet been described. Attempts have been made to germinate the spores of this species, but although these are still undecayed, no signs of growth have yet made their appearance after eighteen months. Professor Douglas Campbell got them to sprout in less time than this, but doubtless the warmer climate of California had some influence in hastening the process. He found a few large chloroplasts in the young plants; but it seems probable that the presence of chlorophyll here is accidental, and depends on the spores being sown contrary to the natural conditions, in the light. An analogous phenomenon occurs when potato tubers are grown under conditions of illumination. Most of the prothallia collected by the writer were found ten centimetres or more below the surface of the soil. Mature sporophytes have been dug up, with the foot-tubercle still intact, and buried often thirty centimetres in the ground. These facts make it very difficult to imagine that the tubercular, deeply subterranean, gametophyte of *B. virginianum* can have been preceded by a green aerial phase as are the quite superficial, colorless, gametophytic buds of *Vittaria*, *Trichomanes* and *Hymenophyllum* described by Goebel, or the larger tuberlike, resting phase of the liverwort *Geothallus* recently studied by Campbell. It is perhaps worth while to suggest that the slow germination of the spores in the case of Pteridophyta, with subterranean prothallia is an adaptation to enable the former to reach a favorable depth in the substratum, before beginning their growth.

V.

A cross-section of the prothallus, such as is represented in figure 15, reveals a number of important features. The antheridial ridge, *x*., is seen above, containing several *antheridia*. On its sloping sides are the *archegonia*, *y*. Multicellular hairs are often found attached to the ridge, to its flanks and to the base of the prothallium. The position of several of these is indicated in the figure at *h*. The internal cells, *a*., of the upper part of the plant appear light in color, and contain protoplasm and small quantities of starch. The lower cells, *b*., both in fresh and stained sections, are dark-colored, and in their natural condition, filled

10. Can. Inst. Proceed. Vol. i. Pt. 1, p. 10. Annals of Botany. Vol. xi., p. 485.

with a heavy oil which is not readily soluble in alcohol. They are likewise occupied by a filamentous fungus which is presently to be described. Figure 16 illustrates a median long-section of the prothallus. At *x*. is seen the antheridial ridge cut lengthwise, and showing the *antheridia* in various stages of development. The younger ones are found nearer the anterior, sloping, apical region, *a.p.* The distribution of the fungiferous tissue is represented in this figure. It is to be noted that it extends forward gradually, as the prothallus increases in length, by the activity of the apical meristem. The fungus never occupies all the cells on the lower side of the prothallus, but leaves free always a few of the lower tiers. Above, as has been already stated, there is a considerable mass of cellular tissue underneath the reproductive organs, quite free from infection and containing a small amount of starch. The symbiont is always present, as it has never been missed in the four or five hundred plants which have been minutely studied. It is not possible to state whether it is indifferent or beneficial to its host; it certainly does not seem to be injurious. The infected cells do not apparently suffer, and perhaps the presence of oil in them, may be interpreted as an indication of improved nutrition. Only experimental cultures can settle this important question.

The growing region of the prothallus is always on the upper side, figure 16, *a.p.* It is marked by the presence of a superficial layer of high columnar cells like those found at the base of the apical incision of the leptosporangiate gametophyte. These are represented in figure 17. One of the columnar cells, *a.*, is in all probability, the initial cell. It is very difficult to secure exactly horizontal sections of the apical region except in very young plants, of which my supply was somewhat limited. These were all used up for longitudinal and transverse series, and I am accordingly unable to describe the horizontal configuration of the initial cell.

The root-hairs are from one to four millimetres in length and are often multicellular, especially when they arise from the crest or flanks of the prothallium. Those which originate from the base are unicellular and longer than the others. These rhizoids are generally about twenty micra in width and are more or less completely cutinized. It is chiefly through them that the symbiotic fungus makes its way into the prothallium. The passage of the fungal *hyphæ* through the cutinized wall of the root-hair, is marked by the formation of thick sheaths which surround the *hyphæ* for ten or more micra of their course. These sheaths are apparently only formed where the fungus has to penetrate an already cutinized wall, and one does not find the phenomenon repeated as the *hyphæ* pass successively through the walls of the internal cells of the

host-plant. Figure 21 represents a broken root-hair, the basal wall of which has become cutinized and consequently forms a sheath where the *hypha* is passing through. The penetration of the next cell-wall inwards is unaccompanied by this phenomenon. In figure 18 can be seen part of a root-hair, *c.*, on the lateral walls of which are two sheaths, and the hair in this case being intact, sheaths are not formed in the uncutinized basal wall. In the same figure sheaths can be seen at *b* and *d*, where the fungus has passed in through ordinary superficial cells of the prothallus. This is apparently of rare occurrence.

After penetrating about two or three layers of cells, *y*, the symbiotic filaments, which are from two to four micra in diameter, begin to grow luxuriantly, and fill the succeeding strata of cells, *x*, with a much-coiled *mycelium*. If this be examined with a good apochromatic objective, it is possible to discover that it is by no means always filamentous, but that in many cases, the *hyphæ* expand into large thin-walled vesicles, which are often so abundant that they fill the cells with a botryose mass resembling a *Completoria*, figure 19, *b* and *c*. In other cells the filaments prevail, *ibid. a*. It is not difficult to satisfy oneself that the *hyphæ* and vesicles belong to one and the same *mycelium*, figure 19, *b*. Frequently some of the vesicular structures become ruptured and shrivel up, *ibid.* Figure 20 shows a freshly infected cell of the prothallus, highly magnified, in which the vesicular structures have just begun to form. Often the advance of the symbiont through the prothallus is marked by the penetration of filaments or by a mixed growth of *hyphæ* and vesicles into new cells. Another kind of organ is also found in the *mycelium*, viz., *conidia*. These are thick-walled and from fifteen to twenty micra in diameter. They are generally formed at the end, but sometimes, though rarely, in the course, of a *hypha*, and are filled with a dense, coarsely granular protoplasm. The contents of the *conidium* are not separated from the filament by a septum and thus resemble the *conidia* of the subform *Aphragmium*[11] of the genus *Pythium*. The *conidium* germinates *in situ*, forming a tube which often makes its way into the adjoining cells of the host-plant. I have never been able to detect the formation of zoospores from these *conidia*, and indeed it is difficult to imagine how they could serve as a means of distribution for so completely endoparasitic a fungus. The stages of formation and germination of the *conidia* are shown in figure 22, *a*, *b* and *c*.

It will be seen from the above account that the symbiont of *Botrychium virginianum* presents several rather remarkable characteristics. In its mode of penetration it resembles *Completoria complens*, as described by

11. Rhabenhorst, Krypt. Flora. Fischer, Phycomyceten, p. 397.

Leitgeb[12] in the prothallia of *Pteris cretica*, *Aspidium falcatum*, and other ferns; the formation of the dark brown sheath from the cell-wall of the host-plant being very characteristic. Atkinson[13] has described a similar phenomenon for a *Completoria* found in the same species of prothallia in America. In the filamentous portion of the undivided *mycelium* as well as in the formation of its *conidia* it markedly resembles a *Pythium*. In the botryose vesicular masses completely filling the cells of the host, it again strikingly simulates *Completoria*. It may perhaps fairly be considered as a form uniting the genera *Pythium* and *Completoria*. If, on further investigation, the above view proves to be correct, it may possibly be necessary to remove *Completoria* from the vicinity of the *Entomopthoracæ*, where it has been placed on account of its ejaculatory *conidia* by Nowakowski and Thaxter, and toreplace it with the *Peronosporaceæ* where Leitgeb, as a result of his careful investigation, considered it to belong.

The endophyte of the prothallium of *Botrychium virginianum*, unlike that of *Lycopodium cernuum*, described by Treub,[14] and that of *L. annotinum*, described by Bruchmann,[15] is always intracellular and never becomes intercellular, in the deeper layers of the host-plant. Treub's description is somewhat brief, but from the fuller account of Bruchmann, the structure of the *mycelium* in the symbiont of *Lycopodium* seems to be quite different from that of the form found in *Botrychium virginianum*.

Only further study of the fungus can settle whether it is a distinct species of *Completoria* or *Pythium*, or, on the other hand, an intercalary species. Before leaving this subject, there is one more interesting fact to record. In older prothallia bearing well-advanced sporophytes, the symbiont is shrunken and dead. Whether this state of affairs is rightly comparable to the similar phenomena observed by Frank in the *mycorhizæ* and *mycodomatia* of various Phanerogamia, at the time of flowering or seeding, and is to be considered as a digestion of the symbiont by its host, must for the present be left in suspense. The prothallia often continue to live long after the death of the endophyte. Nothing of the nature of an *oögonium* has yet been observed in any stage of development of the fungus.

VI.

The *antheridia* arise, after the first basal cluster has been formed, figure

12. Sitzungsberichte d. Akad. d. Wissch. Wien. Math.—Natwissch. Classe. Bd. 84. Abth. i., 1881, p. 291 and p. 307.

13. Bull 94. Cornell Experimental Station, p. 52, 53.

14. Op. Cit. i., p. 124.

15. Op. Cit. pp. 310-313.

1, always on the crest of the antheridial ridge, figure 23. The older *antheridia* are found generally higher on the ridge than the younger ones, figure 23, a^1, a^2, a^3. The first indication of the male organ is a richly protoplasmic superficial cell, which divides transversely, giving rise to a shallow outer cell and a deep inner one, figure 23 a^1. The former becomes transformed into the outer wall of the *antheridium*, and the latter originates by repeated divisions, the mother-cells of the antherozoids. In figure 24 is represented a young stage in which both the inner and outer cells have already undergone several divisions. When the *antheridium* attains about a third of its ultimate size, its outer wall is doubled by periclinal divisions. In figure 25 these are represented as just beginning. Subsequently, the mass of spermatocytes is shut off internally from the prothallium cells by further periclinal divisions, figure 23, a^2, a^3. Often the *antheridia* are accompanied by short multicellular hairs, resembling those found on the rest of the surface of the prothallus and comparable to the paraphyses described by Treub in *Lycopodium phlegmaria*, figure 26, *par.* The more primitive mother-cells of the antherozoids possess large nuclei with numerous nucleoli, figure 27, *a.* After a number of simultaneous divisions of the spermatogenic tissue, the definite spermatocytes are formed. In these the reserve chromatin in the form of nucleoli has disappeared. The filar chromatin is arranged in what appears to be a true *reticulum.* When the formation of the antherozoids begins, the nucleus contracts somewhat and the bars of the chromatic *reticulum* become thickened, figure 27 *b.* The nucleus then assumes a lateral position, and begins to flatten out, figure 27 *c.* This process is continued, and by the lengthening out of the nucleus, the condensation of its chromatin, and the curvature produced by its position in the cell, the antherozoid is formed, figure 27 *d.* The interesting structure to which Webber[16] in his recent studies on the antherozoids of the *Cycadeæ*, has applied the name *blepharoplast*, and which he compares with the cilia-forming body lately discovered by Belajeff[17] in the *Filicineæ* and *Equisetineæ* has been looked for in the developing antherozoids of *Botrychium virginianum*, but has not been made out. This is probably due to the fact that osmic acid fluids could not be used as fixing reagents on account of the oil in the tissues, and because the stains employed were not those used by Belajeff, but either a combination of alum-cochineal and eosin, or aqueous saffranin alone. The material illustrative of spermatogenesis was somewhat limited in amount, and it was not thought advisable to risk the series by removing their covers

16. Bot. Gazette. Vol. xxiv., p. 233.

17. Ueber Nebenkern in Spermatog. Zellen u. d. Spermatogenese d. Farnkräutern. Berichte d. deutsch. Bot. Gesell. Bd. xv., pp. 337-339. Idem—Die Spermatogenese d. Schachtelhalm. Ibid. Bd. xv. pp. 339-342.

and re-staining with the reagents employed by Belajeff. The writer hopes to secure more young prothallia in the coming summer, in which event it will be possible to come to a decision on this important point.

The fully developed antherozoid forms a spiral of one and a-half turns and has the structure usual in the *Filicineæ*. The cilia come off from the attenuated, anterior end of the spiral. I could not decide, from the preserved examples which were the only ones I had the opportunity of examining under high magnification, the exact length of the ciliary region. The antherozoids, like those of *Ophioglossum pedunculosum* described by Mettenius[18], escape from the mother-cells while still within the *antheridium*. They swim about freely in its cavity, figure 28, *a* and *b*: sometimes still retaining their protoplasmic vesicles and in other instances being already freed from them, figure 27, e^1 and e^2. The spermatozoids make their way out by means of an aperture formed by the disappearance of two superimposed cells of the outer wall of the *antheridium*. They do not escape all at once, as is quite generally the case, but seem to be voided in several swarms, at intervals, under undiscovered conditions. The cavity of the *antheridium* is filled with a thin gelatinous matrix, resulting, probably, from the disintegration of the spermatocytic walls, figure 28, *a* and *b*.

VII.

As has already been stated, the *archegonia* originate on the flanks of the median ridge of the prothallia, figure 15, *y*. The youngest stage of the *archegonium* is a single, richly protoplasmic, superficial cell, which, as in the *antheridium*, divides subsequently into an outer shallow cell and an inner deeper one, figure 29. The former gives rise to the neck of the *archegonium*, and the latter to its axial row of cells. The next stage is the horizontal division of the inner rudiment which separates from it the large basal cell, figure 30. The superficial rudiment subsequently begins to divide, first, by anticlinal walls, figure 31; and then by periclinal ones, figure 32; thus forming the neck. The richly protoplasmic basal cell divides, figure 32, and then the upper axial cell undergoes a division, which results in the formation of the cervical canal-cell and the ventral cell; figure 33 and figure 34. In the latter figure is seen a paraphysis, *a*, which is in reality, only one of the multicellular hairs common over the whole surface of the younger parts of the prothallium. In figure 35, the nucleus of the cervical canal-cell has divided, and as may be seen in the next figure 36, the nuclear division

18. Op. Cit.

is not followed by the formation of a cell-wall, such as has been described by Farmer and Campbell in *Angiopteris*, *Marattia*, and *Osmunda*. From the study of many hundred *archegonia* in this stage of development, the statement is made with some confidence that such a wall is never present in *Botrychium virginianum*. In figure 37, is represented an *archegonium* in which the ventral canal-cell has made its appearance. One very rarely finds this canal-cell intact, as it quickly disintegrates and in preserved material, at any rate, is represented by an indistinct mass thrust against the wide base of the cervical canal-cell. In figure 38, is seen a ripe *archegonium* which has ejected its canal-cells. The apical cells of the neck are, as is usual in the Pteridophyta, thrust outwards. At the same time one frequently notices chromatolysis in the nuclei of the upper cells of the archegonial neck, figure 37, although this phenomenon is by no means invariably present.

The mature egg is large and possesses a very dense protoplasm, which however, generally encloses a hydroplastid. The free surface of the oösphere rises into a median elevation, the receptive prominence. Figure 38, was drawn from a preparation in which a single spermatozoid had entered the canal of the *archegonium*. It has not been possible to follow the stages of union of the sexual nuclei. After fertilization, the canal is generally occluded by the closing together of the neck cells, figure 39, although this is by no means invariably the case, figure 40. The oöspore grows to many times its original size before the first division takes place. Figures 39 and 40, represent two stages of the yet undivided oöspore. In figure 41, the first segmentation has occurred, and the basal wall is horizontal, as in the other eusporangiate Pteridophyta. In figure 42, the embryo has become divided into quadrants by the median wall, which is the next to appear, and which, in the majority of cases at least, is parallel to the long axis of the prothallium. The transverse wall next makes its appearance at right angles to the other two. In figure 43, is represented an embryo which has already undergone further divisions. The upper octants have been sub-divided before any similar activity has appeared in the lower segments. There is no indication of a suspensor, and as the lower part of the embryo is not loaded with food materials, it seems probable that the earlier divisions in the upper octants, are for the purpose of thrusting the young sporophyte deep into the prothallium, that it may be more easily nourished and attain its characteristically large size without exposure to injury. The divisions are not always so regular, as in the case of the embryo represented in figure 43. In some instances, the basal wall is rather oblique, and corresponding differences exist in the orientation of

the ensuing divisions, figure 44. Quite often, too, no regular course of segmentation can be made out at all, as in figure 45. When the embryo is only a little larger than those figured in 43, 44 and 45, the basal, median, and transverse walls are quite obscured by subsequent divisions. It is not possible to detect any indication of apical initials such as commonly occur in the early phases of the leptosporangiate sporophyte, and such as have also been described in some, at least, of the eusporangiate Pteridophyta. The next phase which is chosen for representation, is that in figure 46. Although no apical cells could be made out in this preparation and others of the same age, there is in the example figured, a very considerable formation of periclinal walls in the upper internal region of the embryo. The whole lower portion of the young sporophyte forms the foot, figure 46 *f*. In figure 47, is shown an embryo in which the root and shoot have already become differentiated. The periclinal activity already referred to, has led to the formation of a large amount of tissue in the upper portion of the embryo, and this is supported on the broad basis furnished by the foot. A high merismatic epidermis has already become differentiated at *x*, the cells of which are very rich in protoplasm and have the elongated columnar configuration of the shoot meristemeta of most of the Pteridophyta. Among these, the one marked *a* seems to be the initial cell. At *y*, is a protuberance which is the outward indication of the first root. Within this, at *b*, is the apical cell of the root, distinguished by its darkly-stained protoplasm, and by the fact that it has just undergone its first periclinal division. The condition of the embryo of *Botrychium virginianum* at this stage, is remarkable in that the stem-apex appears before the first leaf. The cotyledon is consequently derived from the shoot meristem, just as the later leaves are, but as in the case of the latter, it is not possible to follow the changes in the meristem leading to the formation of the foliar rudiment. The difficulty is greater in the case of the cotyledon, on account of the comparative paucity of younger embryos which have been cut exactly axially. For this investigation nearly three hundred series o prothalli, from two to twenty millimetres in length, have been sectioned. In spite of this not inconsiderable labor, less than twenty per cent. proved to be of value, either because no embryos were present, which is very commouly the case; or being present, they were not cut in a truly median plane. The surface of the gametophyte presents such irregularities that the proper orientation of the younger phases of the embryo is entirely a matter of chance. So far as I am aware the embryo of the *Equisetaceæ* presents the only other case yet described, in which the primitive foliar organ is secondarily

derived from the shoot-apex. Sadebeck[19] makes the following statement concerning the equisetaceous embryo:—"Nach meinen Untersuchungen bin ich vielmehr zu dem Resultat gekommen, dass die obere Hälfte des noch zweizelligen Embryo ganz unmittelbar die primäre Axe darstellt, aus welcher sich in gleicher Weise, wie später bei der erwachsenen Stammknospe die Blätter erzeugen."

The embryo of *Isoëtes echinospora*, as described by Campbell,[20] also resembles in a measure that of *B. virginianum*. It has a large foot originating from *both* the hypobasal quadrants, which by its position and size, at least, somewhat strikingly resembles that of *Botrychium*. In the case of the latter, it is quite impossible to state from which of the primitive divisions of the fertilized egg, the foot takes its origin. A resemblance also exists in the formation of the root and shoot from the upper part of the embryo. In *I. echinospora*, however, the cotyledon is the first shoot-organ to appear, and the stem-meristem does not definitely develop until later, although there is an indication of its existence from the first.

It is not to be supposed, however, that these resemblances are in any way to be considered as indicative of relationship, for the development of the embryo may vary greatly in the same natural group. In the *Marattiaceæ*, for example, both *Angiopteris* and *Marattia*, as described by Farmer[21] and Campbell,[22] are distinguished by the precocious development of the cotyledon. In *Danæa*, [23] on the other hand, it is the root which first shows considerable development. A somewhat similar state of affairs has been observed by the writer in the *Equisetaceæ*. *Equisetum arvense* and *E. hiemale* have a precocious root, whilst *E. limosum* and *E. palustre* develop first the shoot-organs. Among the *Ophioglossaceæ* themselves, in *Ophioglossum pedunculosum*, the cotyledon is the first organ to rupture the *calyptra*. In *Botrychium virginianum* and *B. Lunaria*, the root is prior in appearance.

In figure 48, is represented an embryo, which, although larger, is yet younger than that in figure 47. At *a* and *b* are probably the root and shoot initials. Figure 49 is an older stage than figure 47. The root, *r*, is already well advanced and its apical region is fully developed. Behind

19. Die Entwick. d. Keimes d. Schachtelhalme. Pringsheim. Jahrbucher f. Wiss. Botanik. Bd. xi., p. 582.

20. Annals of Botany, vol. v., p. 244.

21. Annals of Botany, vol. vi., p. 265.

22. Annals of Botany, vol. viii.

23. Brebner, G. On the Prothallus and Embryo of *Danea simplicifolia*. Annals of Botany, vol. x., p. 103.

its terminal meristem are elongated cells which, later, give rise to fibro-vascular tissues. The cotyledon, *c*, is also for the first time visible, and beside it is the stem-meristem, *s*. Below is the very massive foot, *f*. Figure 50, lithographed from a photomicrograph, represents a still later stage of development. Here the root is almost ready to burst the *calyptra*, *cal*. The cotyledon is distinctly seen, and at this stage, for the first time, covers over the stem-apex, which now lies on the side of a transverse fissure. No vascular tissue appears till the root has grown to a length varying from five to twenty millimetres, and has burst the *calyptra*. The first tracheides arise in the proximal region of the root after it has emerged from the prothallium. Subsequently they make their appearance in the cotyledon and the stem-axis.

Before referring to the further developmental changes in the nascent sporophyte, it will be well to consider an interesting abnormality. In figure 51 is represented part of a prothallus in which tracheides are present, near a region of superficial decay. The decayed spot probably marks the position of an embryo which has been injured and in consequence has rotted away, So far as I have been able to learn, by reference to the literature on the subject, such prothallial tracheides are the invariable accompaniment of apogamy. Their presence was first described in connection with this phenomenon by Farlow[24] in the apogamus prothallia of *Pteris cretica*. They have since been seen by many observers under similar conditions. Lang[25] has recently found them in the interesting reduced, apogamous, sporangiferous sporophytes of *Lastræa dilatata*, Presl, var. *Cristata gracilis*, Roberts and *Scolopendrium vulgare*, L., var. *ramulosissimum*, Woll. According to Bower, tracheides also occur in the prothallia [endosperm] of certain Cycads. In view of the recent discoveries of antherozoids in the pollen-tubes of this group, it would be interesting to know if the Cycads also manifest the phenomenon of apogamy.

The example figured is the only occurrence of prothallial tracheides which has come under my notice in examining a large number of gametophytes. In this case both *antheridia* and *archegonia* were present. Recently an example of apogamy in *Pteris aquilina* has come under my observation in which an apogamous and a normal embryo were produced side by side on the same archegonial pad. The former was accompanied by a single prothallial tracheid. The apparent rarity of the phenomenon in *Botrychium virginianum* may be due to the conditions under which the Metis specimens, which I have almost exclusively

24. Quarterly Journal of Microscopical Science, vol. xiv., N.S., p. 266.

25. Annals of Botany, vol. xi., pp. 157-168; also, Proc. of Royal Society of London.

investigated, grew. They were found as has been already stated, virtually submerged in a peat-bog, and as a consequence, absence of proper water supply which has been noticed as a predisposing cause of apogamy, would not make itself felt. Possibly prothallia from the rich, rather dry soil of the Don valley might yield a greater number of examples. If we may infer apogamy from the presence of prothallial tracheides, the gametophyte of *Botrychium virginianum* is unique among the eusporangiate vascular Zoidogama, in this respect; unless the phenomenon is shown to be present in the tracheid-bearing Cycad endosperms described by Bower, and apogamy can no longer be considered as peculiar to the leptosporangiate *Filicineæ*.

Returning to the young sporophyte, the shoot-organs and the root possess fairly well marked apical cells, as is shown by Campbell[26] to be true also of the mature spore-plant. Figure 52 represents the terminal meristem of the young stem in vertical section. At *a* is probably the apical cell. In figure 53 the same region is shown in horizontal section. In figure 54 is the apex of the cotyledon in longitudinal section. Figure 55 represents a long section of the apex of the first root in an embryo which has not yet broken through the *calyptra*. A large primary segment is found on the side of the *pileorhiza*, a state of affairs rarely seen in later stages of the root, as subsequently the small cells of the inner part of the root cap abut immediately on the apical cell. This is possibly to be explained by the comparatively slight development of the *pileorhiza* which consequently requires only very occasional contributions from the apical initial. The root of *Botrychium virginianum* is an endotrophic *mycorhiza* and, as has been shown by Frank, there is a tendency to degeneracy in the root-cap of roots of this type. The apical cell is much more active on its flanks although even here it divides slowly, compared with the apical initial of the leptosporangiate *Filicineæ*. In figure 56 the root-apex is seen in transverse section, and unlike that of the stem, its initial cell is triangular in this plane.

Figure 57 shows an interesting case of polyembryony corresponding to that described by Treub[27] in *Lycopodium cernuum*. It was first noticed after a series had been made of what appeared externally to be a bifurcated embryo. The central cylinders of two plants, *a* and *b*, are shown; *a* is larger and much more abundantly supplied with reserve food-materials, which cause it to stain more intensely; *b* is smaller, less developed, and in a condition of malnutrition as is indicated by a corresponding paleness of hue; a^2 is the second root of embryo *a*, and is

26. Campbell. Mosses and Ferns; pp. 232, 235.

27. Etudes sur les Lycopodacées; Extrait vi., p. 11.

quite fully matured ; a^3 is the foliar trace of the cotyledon, which is just being separated by a layer of decidual periderm ; x is the central cylinder of a, with the trace of the second leaf just making its appearance ; b^2 is the still embryonic second root of the smaller embryo b ; b^3 is the young cotyledon and y is the central cylinder. Figure 58 represents a lower section in the same series with the same lettering as before ; a^1 is the primary root of the better developed embryo, and b^1 is that of the smaller embryo. At a^2 is a prominence indicating the point of origin of the second root of the larger embryo. Figure 59 is of a section still lower down and passes through the common foot of the geminal sporophytes. The staining alone indicates the boundary between the two plants. Their central cylinders are separate throughout, but the fundamental tissues appear to be in textural continuity. A quite sharp demarcation, however, is produced by the different condition of nutrition of their cells ; those on the side of a being loaded with starch ; those of b, on the other hand, containing only a very small amount. Unwillingness to sacrifice the series prevented the use of the ordinary methods of demonstrating protoplasmic continuity for the purpose of discovering whether the protoplasm of the two was in reality continuous. The phenomena of nutrition would seem to negative such a supposition. Figures 57, 58 and 59 have been lithographed from photomicrographs.

The first root of the young sporophyte is sometimes diarchous, but just as often triarchous. There seems to be no relation between the vigor of the root and the number of protoxlyem-strands ; as depauperate plants sometimes have three strands, and, on the other hand, robust individuals often have only two. I have not found a single example of a monarchous root in the large number of specimens which I have examined. Figure 60 is a drawing of a section of a diarchous primary root in aqueous analinsulphate. The endodermis a is quite distinct, and shows plainly the characteristic radial lignified zones. Between it and the vascular tissue are one or more layers of pericycle cells. The protoxylem tracheides, x, are reticulate in their sculpture and not ringed or spiral as is generally the case. The metaxylem elements almost always meet in the centre. The bast, y, is made up of thick-walled elements, some of which are sieve-tubes and the rest elongated parenchyma cells. Between the bast and the vessels, is a considerable amount of wood parenchyma. Often two or three diarchous roots are formed, but sooner or later triarchous, and finally tetrarchous ones are produced.

The central cylinder of the stem becomes fully differentiated below the point of origin of the cotyledon. From the very first it has a well-

marked pith, figure 61 *m*. The pith communicates with the external fundamental tissue through a gap caused by the exit of the cotyledonary trace, as has been described by Van Tieghem[28]. The internal endodermis discovered in the younger portion of the stem of *Botrychium Lunaria* and others of the *Ophioglossaceæ* by Van Tieghem[29] and Poirault[30], is not present in this species, although the external endodermis is well-marked, only disappearing opposite the foliar gaps. The bast-tissue originates first in the young central cylinder and seems never to have any secondary additions from the activity of the *cambium*. Graf zu Solms[31] has thrown doubt on the existence of secondary wood in the *Ophioglossaceæ*, but in this species there can be no uncertainty as to its presence; in fact, the wood is practically all secondary, as may be learned from the radial arrangement of its matured elements and by following the course of its development, figure 63 *x*, and figure 64 *x*. The first-formed wood-elements are reticulately sculptured and are never of the ringed or spiral type. In this respect they resemble those of the stem of the *Marattiaceæ*, and, in fact, also those of the *Osmundaceæ*; for the groups of typical protoxylem elements found in the upper region of the bundles of the latter, really belong to the leaf-traces. It is more than probable that the absence of typical primitive tracheary tissue in all these cases, is due to the very slow growth of the stem, a phenomenon which renders their presence unnecessary. The writer has noticed the absence of these elements in the slowly growing stems of species of so-called polystelic *Primulæ*, viz :—*P. Auricula* and *P. farinosa*.

During this investigation, the rather interesting observation has been made, that the periderm-tissue first described in the *Ophioglossaceæ* by Russow[32] and Holle[33], is formed in *Botrychium virginianum* at the bases of defunct leaves, and thus is merely an abciss-layer. Figure 65, from a photomicrograph, shows a young sporophyte still attached to its prothallium; *r* is the first root and *x* the base of the cotyledon; l^2 and l^3 are developing leaves. As may be seen from the figure, the course of the cotyledonary bundle *x*, has been interrupted by the interca lation of a layer of periderm. Figure 66 shows the tissues in question under a sufficiently high magnification to make clear the details of periderm formation. By the continued growth of the latter the distal part of the

28. Remarques sur la structure de la tige des Ophioglossées. Journal de Botanique. iv., Année; p. 407

29. Op. Cit.

30. Recherches sur les Cryptogames vasculaires. Annales de Sci. Nat. Bot. Tome xviii.; p. 170.

31. Fossil Botany, p. 223.

32. Mém de l'Acad. Imp. des Sciences de St. Petersbourg. vii. Serie. Tome xix., No. 1, p. 117.

33. Bot. Zeit. 1875. Ueber Bau u. Entwicklung der Ophioglosseen, p. 12.

leafstalk is forced continually outwards and eventually decays, leaving no trace of its existence. This is the reason that, in transverse sections of older stems, the foliar bundles of fallen leaves apparently disappear before reaching the external cortex. The periderm formation of *B. virginianum* is thus connected with the occlusion of the leafstalks, and is probably to be explained as an adaptation for protecting the subterranean stem from infection by the fungi of the soil.

In a transverse section through the older region of the stem, the periderm is never found to form a continuous investiture as in the higher plants, but is strictly localized in areas representing the points of origin of former leaves. The writer has not yet had an opportunity of investigating whether the mode of cork formation obtaining in *B. virginianum* is common to the whole group, but it seems probable that this may prove to be the case. Periderm is also often formed both in the sporophyte and in the gametophyte where surface injuries have occurred: a striking case of correspondence between the two generations.

The cotyledonary trace originates from the central cylinder as a single strand, figure 61, *cot.*; but separates shortly after reaching the petiole into two approximately collateral bundles. These pass upwards through the long leafstalk into the lateral lobes of the lamina, one of them giving off a bundle for the median lobe, exactly as in the postcotyledonary leaves of many *Filicineæ*. The endodermis is never quite continuous on the inner side of the cotyledonary trace, and in subsequent leaves becomes less and less marked, till at the stage in which there are four petiolar bundles, it is entirely absent. Figure 67 represents the laminar portion of the ninth leaf of a sporophyte which was still attached to its prothallium. The fertile segment, *f. s.*, of the lamina is already present. This plant was at the same time the oldest sporophyte still in connection with the gametophyte, and the youngest already producing spores, which has come under my notice during the present investigation.

In figure 68 is a still attached young sporophyte. Its prothallium is infected with the already defunct symbiont, *a*. The spore-plant still bears its cotyledon l;[1] and two younger leaves, l^2 and l^3 are in the process of formation. In the primitive root, *r*, can be seen at *x* and *y*, certain dark spots which are cells occupied by the sporophytic endophyte. There is no resemblance between the latter and that of the gametophyte as its mycelial filaments are much larger, being generally about eight micra in diameter. There are no vesicles nor *conidia* present, and in fact the sterile *mycelium* is uniformly filamentous in character. These features are reproduced in figure 69. The occurrence of a symbiont in the roots

of the *Ophioglossaceæ* has long been known, and is mentioned by Russow and Holle in the works already cited. The latter refers to its presence or absence, the varying number of protoxylem groups in the larger and smaller roots of *Botrychium matricariæfolium*. In *B. virginianum* this explanation cannot be accepted, as, although the first formed roots vary greatly in the number of archixyles, it is only in rare cases like that figured in 68 that the fungus is present.

VIII.

The results of this investigation may be summarized as follows :—

(1). The gametophyte of *B. virginianum* is entirely subterranean, without chlorophyll and probably symbiotic. It is from two to twenty millimetres in length by one and a-half to fifteen millimetres in breadth, and oval in outline, whether viewed from above or from the side.

(2). The whole surface of the plant is beset with rhizoids, which are generally multicellular. The upper part of the gametophyte is occupied in most prothallia, which have not yet produced embryos, by a median ridge. The reproductive organs are found exclusively on the superior surface, the *antheridia* being situated on the crest of the ridge, and the *archegonia* on its flanks.

(3). The gametophyte grows by a well-marked apical meristem which is situated on the upper side, anteriorly, and apparently originates from a single initial cell.

(4). There is present in the lower part of the prothallus, an endophytic fungus, possessing characteristics which will perhaps, on further study, justify its recognition as a form intermediate between the genera *Pythium* and *Completoria*. The symbiont is accompanied by a large amount of oil, and probably advantageously affects the nutrition of the prothallus. The fungus dies after one or more embryos have reached a considerable size.

(5). The *antheridium* originates from a single superficial cell and is characterized by possessing a double outer wall. The antherozoids are of the ordinary filicineous type and are rather large in size.

(6). The *archegonium* likewise takes its origin from a single superficial cell. The neck consists of seven or eight tiers of cells. The cervical canal-cell is binucleate, but is never represented by two cells. A stratum of basal cells is present.

(7). The first division of the fertilized egg is transverse, as in the other eusporangiate Pteridophyta. The identity of the octant walls which are

formed in the usual way, is early lost, and the embryo grows to a relatively large size before the organs make their appearance. The root and shoot originate from the upper part of the embryo; and it may perhaps be inferred that, like those of *Isoetes echinospora*, they are derived from the upper octants. The foot is formed from the whole of the lower region of the embryo. The cotyledon is apparently derived secondarily from the shoot meristem.

(8). The root, the stem, and the cotyledon grow by the segmentation of a single apical cell, as in the adult plant. The root develops more rapidly than the other organs; and the second or third root may make its appearance before the cotyledon unfolds. The latter is green and capable of assimilation, as in *Ophioglossum pedunculosum*.

(9). The root-system of the young sporophyte is soon occupied by a symbiotic fungus, which differs in the size of its filaments and in several other respects, from that found in the gametophyte.

(10). Evidence of apogamy has been found in the form of prothallial tracheides.

(11). One example of polyembryony was observed.

(12). The sporophyte remains for a long time attached to the gametophyte. It is an open question whether this is a primitive characteristic, or merely an adaptation. The fact that the young sporophyte of the much less robust *B. Lunaria*, according to Hofmeister's account remains for a very short period attached to its gametophyte, would seem to justify the latter assumption.

IX.

In coming to any conclusions as to the bearing of this research on the phylogenetic position of the *Ophioglossaceæ*, due weight should be given to the fact that the present species is the only one which has been somewhat fully investigated; and the results of recent observations on the *Marattiaceæ*, *Lycopodiaceæ*, and *Equisetaceæ* show that a very considerable variety of development may exist even within the same natural group. Moreover the saprophytic habit of the gametophyte of *B. virginianum* has in all probability more or less profoundly modified its structure.

It will be convenient to consider first the position of *B. virginianum* in regard to the other representatives of the *Ophioglossaceæ* which have been studied. Its prothallus resembles very closely that of *B. Lunaria*, and shows indications of being only a more specialized type. That this

is the case is rendered probable by the strict localization of the *antheridia* on the antheridial ridge, and by the occurrence of the reproductive organs on the upper surface of the gametophyte. It is interesting in this connection to note the scattered disposition of the *antheridia* in the very young prothallus; for this is probably to be regarded as a primitive feature. An embryological comparison between the two forms is not possible, as the embryology of *B. Lunaria* is at present unknown. The young sporophyte of *B. virginianum*, in that it is attached to the upper surface of the prothallus, and has a completely developed and assimilatory cotyledon, differs from the sporophyte of *B. Lunaria*. The young spore-plant also remains much longer attached to the gametophyte than is the case in the latter species. *B. virginianum* seems, of all the representatives of the genus in Canada at least, to be the most completely adapted to modern conditions; for it is everywhere abundant in rich woods, and always outnumbers the other species.

The prothallus of *Ophioglossum pedunculosum* does not very closely resemble that of *B. virginianum*. The presence of a primary tubercle and the formation of green prothallial lobes are its characteristic features. It should be remembered, however, that within the single genus *Lycopodium*, *L. annotinum* resembles in its prothallus *B. virginianum* and *B. Lunaria*, whilst *L. cernuum* and *L. inundatum* have a gametophyte like that of *Ophioglossum pedunculosum*. It is possible that a species of *Botrychium* may yet be found in which the prothallus is like that of *Ophioglossum pedunculosum*. The *antheridia* and antherozoids of the present species quite exactly resemble Mettenius' description of those of *Ophioglossum pedunculosum*. The *archegonia* correspond, too, in so far as the earlier description offers points of comparison. In the development of the embryo, the account of Mettenius is rather too meagre to allow of any exact inferences in regard to points of likeness in the successive phases of segmentation. The young sporophyte of *Ophioglossum pedunculosum* develops its cotyledon early, and the primary root is slow in pushing its way out, which exactly reverses the course of events in *B. virginianum* and probably also in *B. Lunaria*.

Bower[34] has recently fully discussed the relationships of the *Ophioglossaceæ* to the other groups of the Pteridophyta. He comes to the conclusion that the ventral fertile leaf-segment of the *Ophioglossaceæ* is the morphological equivalent of the single ventral sporangium of the homosporous *Lycopodineæ*, and derives it from the former by a process of septation and branching. He also compares the two groups in

34. Studies in the morphology of spore-producing members. Part 2. *Ophioglossaceæ*. p. 56, et seq.

regard to the structure of the vegetative organs of the mature sporophyte, and finds that in this respect they also show a marked resemblance to one another. Lastly, the organization of the gametophyte and the development of the sporophyte, are discussed in the same connection with a like conclusion.

It is only necessary in considering the results of the present investigation, to examine the latter features. In regard to the structure of the prothalli, the two groups certainly do present marked likenesses; *e.g.*, the gametophyte of *Ophioglossum pedunculosum* to those of *Lycopodium cernuum* and *L. inundatum*, and the gametophytes of *B. Lunaria* and *B. virginianum* to that of *L. annotinum*. It is quite possible, however, that the resemblance in these cases is due to a similarity in environment.

The male organs of the two groups are in some important features quite different. The *antheridium* has a double outer wall in the *Ophioglossaceæ* and the antherzoids are spiral and multiciliate. In the homosporous *Lycopodineæ*, the *antheridium* has a simple outer wall, and the antherozoids have the general configuration and the two cilia of the antherozoids of the Bryophyta.

The *archegonia* of *B. virginianum* at least, resemble those of the *Filicineæ*, (excluding *Isoetes*, which probably does not belong here), in having a basal cell and a single binucleate canal-cell, or at most two neck canal-cells. On the other hand the *Lycopodineæ* and *Equisetaceæ* are without the basal cell and have a decided tendency to increase the number of cervical canal-cells. Too much importance should not, however, be attached to these structural features of the *archegonia*.

The embryo of *B. virginianum* and apparently that also of *O. pedunculosum*, lacks the suspensor and primary sporophytic tubercle which are so characteristic of most of the isosporous *Lycopodineæ*, and in these defects resembles the *Filicineæ*. So far as the facts in the case of *B. virginianum* go, it seems probable that the *Ophioglossaceæ* are much more closely allied to the eusporangiate *Filicineæ* than to the isosporous *Lycopodineæ*, although they may be possibly the nearest of the megaphyllous Pteridophyta to that group. In all probability, the *Ophioglossaceæ* are more primitive than the *Marattiaceæ* which they in some respects resemble.

As a result of the fuller knowledge in recent years of the segmentation of the embryo of the Pteridophyta, it is scarcely possible to retain any longer the conception of octants propounded by Leitgeb and others when the leptosporangiate *Filicineæ* were practically the only ferns in which

anything of the embryology was known. In the homosporous *Lycopodineæ* the apex of the stem, the cotyledon, and the root, are all according to Treub's description, derived from the hypobasal half of the embryo. In *Isoetes, echinospora*, the same three organs, according to Campbell's account, originate from the epibasal octants, the foot being formed from *all* the hypobasal octants. No recent complete investigation of the embryology of the *Selaginelleæ* is available, but the phases of development described by Pfeffer can only be harmonized with the octant theory by something like a *tour de force*. In the *Equisetaceæ*, according to Sadebeck, the shoot originates from the upper octants, and the root and foot from the lower octants, the primitive leaves being derived secondarily from the shoot meristem. The *Ophioglossaceæ*, as represented by *B. virginianum* resemble embryologically *Isoetes echinospora*. The segmentation of the *Marattiaceæ* alone, agrees fairly well with the stages of development found in the leptosporangiate *Filicineæ*, and it is not very difficult in this group to refer the organs to definite pairs of octants. But of all the eusporangiate forms, the *Marattiaceæ* come closest to the leptosporangiates, and this probably is the explanation of their embryological agreement.

If we are to accept the hypothesis that the eusporangiate Pteridophyta are primitive, and if we follow Bower in deriving their sporophytic phase from the progressive sterilization of the potential sporogenous tissue of intercalary sporogonium-like forms, the axis is certainly to be regarded as primitive, and the leaves and roots must be considered as secondary outgrowths from the axis; either by eruption as Bower surmises, or by some other undiscovered process. According to this conception, foot and shoot are the primitive organs, and leaf and root are subsequently derived from the latter. This view of the matter harmonizes with what is known of the embryology of the lower eusporangiates. In the highly specialized leptosporangiates on the other hand, a process of acceleration and rearrangement has been carried out and the organs appear precociously, in definite relation, to the earlier segmentations of the embryo.

In conclusion, the writer wishes to express his special obligations to Professor G. L. Goodale of Harvard University for very kindly putting at his disposal the books of the Gray Herbarium.

EXPLANATION OF PLATES.

PLATE I.

FIG. 1.—Youngest prothallium found, *ar.* antheridial ridge. × 8.

FIG. 2.—An older stage in which the antheridial ridge has become more marked. × 16.

FIG. 3.—A considerably older gametophyte on which is a developing embryo, *em.* The antheridial ridge, *ar*, is particularly prominent. This prothallium is lithographed from a photomicrograph. × 7.

FIG. 4.—A lobed prothallus from a photomicrograph. × 4.

FIG. 5.—From a photomicrograph; represents a younger phase in which the root-hairs are abundant. × 8.

FIG. 6.—A lobed prothallus lithographed from a photomicrograph, and bearing two embryos, em^1 and em^2. × 4.

FIG. 7.—A young sporophyte showing the first root. × 8.

FIG. 8.—A young sporophyte showing two roots; the cotyledon is still unexpanded. × 4.

FIG. 9.—A young sporophyte with the primary root and the cotyledon. × 1.

FIG. 10.—A stouter sporophyte with three roots and the cotyledon. × ⅔.

FIG. 11.—A lobed prothallus bearing two advanced sporophytes. × 1.

FIG. 12.—A prothallus bearing two further advanced sporophytes. × ¼.

FIG. 13.—A bifurcated sporophyte still attached to its prothallium. × 4.

FIG. 14.—An eight year sporophyte still attached to its prothallium. × ⅔.

FIG. 15.—A cross-section of a prothallus showing the antheridial ridge, *x*; the fungiferous cells, *b*; and the uninfected cells, *a*. At *y* are the archegonia, and *h*, root-hairs. × 16.

FIG. 16.—A long-section of the prothallus; lettering the same as in the preceding figure. *ap*, apical region. × 16.

FIG. 17.—Apical meristem. *a*, apical cell of prothallus. × 250.

FIG. 18.—Showing the penetration of the fungus into the gametophyte. *c*, root-hair; *b* and *d*, superficial cells, in which the cutinized sheaths have been produced; *x*, fungiferous cells; *y*, uninfected cells; *a*, conidia. × 250.

FIG. 19.—Fungiferous cells; *a*, with purely filamentous mycelium; *b* and *c*, mixture of filamentous and vesicular mycelium. × 600.

FIG. 20.—Cell showing the formation of vesicles, *f*, as outgrowths from a hypha, *h*. × 1,000.

PLATE II.

FIG. 21.—Base of a broken root-hair; *s*, cutinized sheath; *b*, hypha of penetrating fungus. × 1,000.

FIG. 22.—*a*, formation of conidium; *b*, ripe conidium; *c*, germinating conidium. × 1,000.

FIG. 23.—Antheridial ridge showing three antheridia in different phases of development, a^1, a^2, and a^3. × 250.

FIG. 24.—An older antheridum. × 250.

FIG. 25.—A still older phase in which the outer wall is undergoing division. × 250.

FIG. 26.—Antheridial ridge showing the formation of paraphyses, *par*. × 90.

FIG. 27.—Development of antherozoids; *a*, young sperm-cells. × 500. *b*, definite spermatic mother-cells; *c*, a later phase of the same, the nucleus is beginning to become crescentic; *d*, young antherozoids within the mother-cells; *e*, ripe antherozoid. In e^1, the protoplasmic vesicle is still retained; in e^2, it has disappeared. × 1,000.

FIG. 28.—Matured antheridia showing the doubled outer wall; within, the antherozoids are swimming in a gelatinous matrix. In *a*, they are escaping. × 250.

FIG. 29.—First stage in formation of the archegonium. × 250.

FIG. 30.—A later phase showing formation of the basal cell. × 250.

FIG. 31.—Anticlinal division of the cervical rudiment. × 250.

FIG. 32.—Periclinal divisions of the cervical portion of the archegonium. × 250.

FIG. 33.—Nuclear division of the axial cell. × 250.

FIG. 34.—The same completed. A paraphysis at *a*. × 250.

FIG. 35.—Nuclear division of the cervical canal-cel × 250.

Fig. 36.—The same completed. × 250.

FIG. 37.—Ripe archegonium, showing the ventral canal-cell. × 250.

FIG. 38.—Opened archegonium with penetrating antherozoid. × 500.

FIG. 39.—Fertilized egg. × 250.

FIG. 40.—The same older and larger. × 250.

FIG. 41.—First division of the embryo. × 250.

FIG. 42.—Formation of the median wall of the embryo. × 250.

FIG. 43.—An older embryo in which anticlinal divisions are present in the upper octants. × 250.

FIG. 44.—Another embryo of the same age, with oblique walls. × 250.

FIG. 45.—The same age as the foregoing, showing irregular segmentation. × 250.

FIG. 46.—A more advanced phase showing periclinal activity in the upper cells of the young embryo at *a*; *b* is the foot region. × 250.

PLATE III.

FIG. 47.—An older embryo ; *y*, the root ; *x*, the shoot ; *f*, foot ; *a*, initial cell of shoot ; *b*, initial cell of root. × 250.

FIG. 48.—A younger, but larger embryo than the foregoing, with the same lettering. × 250.

FIG. 49.—An advanced embryo ; *r*, root ; *c*, cotyledon ; *s*, shoot ; *f*, foot. × 160.

FIG. 50.—From a photomicrograph. Lettering as before ; *cal*, calyptra. This embryo is considerably older than the foregoing. × 50.

FIG. 51.—Part of a prothallium containing tracheides ; *a*, decayed spot where an embryo has probably disappeared ; *t*, tracheides. × 250.

FIG. 52.—Apical region of the shoot in vertical section ; *a*, the initial cell. × 250.

FIG. 53.—The same, in horizontal section ; *a*, the apical cell. × 250.

FIG. 54.—Longitudinal section of the apex of the cotyledon ; *a*, apical cell. × 250.

FIG. 55.—Apical region of the primary root ; *a*, apical cell. × 250.

FIG. 56.—Tranverse section of the same ; *a*, apical cell. × 250.

FIG. 57. Transverse section of two united embryos, *a* and *b*. a^2 is second root of *a* ; a^3, cotyledon of *a* ; *x*, central cylinder of *a* ; b^2, second root of *b* ; b^3, cotyledon of *b* ; *y*, central cylinder of *b*. × 50. (From a photomicrograph).

FIG. 58.—The same, a section through a lower region. Lettering as in the previous figure. a^1, first root of *a* ; b^1, first root of *b*. × 50. (From a photomicrograph.)

FIG. 59.—Section through the foot-region of the same embryos. Lettering as before. × 50. (From a photomicrograph.)

FIG. 60.—Transverse section of a diarchous primary root : *a*, endodermis ; *x* xylem ; *y*, phloëm ; *b*, parenchyma. × 250.

PLATE IV.

FIG. 61.—Transverse section of the young stem, above the exit of the cotyledonary trace : *cot.* cotyledonary trace ; *c.c.*, central cylinder ; *m*, medulla. × 50. (From a photomicrograph).

FIG. 62.—The same, more highly magnified. × 160. (From a photomicrograph).

FIG. 63.—Part of the central cylinder of the foregoing, more highly magnified ; *en*, endodermis ; *y*, phloëm ; *x*, xylem ; *camb*, cambium ; *s. t.*, sieve-tube ; *m*, medulla. × 220. (From a photomicograph).

FIG. 64.—Part of central cylinder of quite a young plant ; *en*, endodermis ; *ph*, phloëm ; *camb*, cambium ; *x*, xylem ; *m.r.* medullary ray.

FIG. 65.—Longitudinal section of an attached sporophyte ; *r*, primary root ; *x*, remains of cotyledon ; l^2 and l^3, developing leaves. × 20. (From a photomicrograph).

FIG. 66.—The base of the cotyledon from the preceding, more highly magnified, showing the formation of abciss-periderm at *j*. × 160. (From a photomicrograph).

FIG. 67.—Lamina of an attached sporophyte, eight years old, showing the fertile segment, *f. s.*, and sterile segment, *s. s.* × 8.

FIG. 68.—Longitudinal section of an attached young sporophyte; l^1, cotyledon; l^2 and l^3, developing leaves; *r*, primary root; *x* and *y*, endophytic fungus of the sporophyte. × 20. (From a photomicrograph).

FIG. 69.—Cells of the primary root, containing the fungus of the sporophyte. × 420.

FIG. 70.—Transverse section of a prothallus: *ar*, antheridial ridge; *em*, an embryo. × 20. (From a photomicrograph).

THE PICTS.

By Rev. Neil MacNish, B.D., LL.D.

(Read 10th April, 1897).

The question, Who the Picts were, and what the language was which they spoke, still continues to evoke attentive interest. Mr. Nicholson, Bodley's Librarian in the University of Oxford, published about a year ago, a little book to which he has given the designation: "The Vernacular Inscriptions of the Ancient Kingdom of Alban." His aim is to prove, and he has been very successful in establishing his contention, that the Pictish Inscriptions which he has examined and deciphered, indicate that Gaelic was the language of the Picts. He is correct in stating that three theories have been held with regard to the language of the Picts. It has been maintained that that language is closely akin to Irish and Scottish Gaelic It has also been contended that it has a strange resemblance to the Cymric branches of the Celtic language. Further, there are those who are of the opinion that the language of the Picts is neither Celtic nor even Aryan, but that it has a strong likeness to the language of the Basques. It is unfortunate that no literary remains of any description have come down to our time from the period in the history of the Picts which preceded their union with the Scots in 844, to form henceforth one kingdom. It is with the sculptured stones of the Picts that Mr. Nicholson concerns himself. He avers that there are eighteen Inscriptions, that they are all cut on stones, that several of them are now in the National Museum of Antiquities, Edinburgh, and that with three exceptions they are written in Ogam letters. Professor Rhys of Oxford, who has devoted great pains on the decipherments of Pictish Inscriptions, advances the conjecture that the Ogam characters were invented by a "Goidelic native of Siluria or Demetia, who having acquired a knowledge of the Roman alphabet and some practice in a simple system of scoring numbers, elaborated the latter into an alphabet of his own, fitted for cutting on stone and wood." The Ogam alphabet is confined to the British Isles. No Ogam Inscriptions are found elsewhere. Numerous Inscriptions in that character have been discovered in Ireland, in portions of Scotland, including the Shetland and Orkney Isles, in the Isle of Man, in Wales and in England. In the Book of

Ballymote, which was compiled towards the close of the fourteenth century, and which is now in the Library of the Royal Irish Academy, there is a special tract wherein the different styles of Ogamic writing and the value of the letters are explained. Whether Mr. Nicholson received any material assistance from the tract in the Book of Ballymote in his laudable determination to interpret the Pictish inscriptions or not, it is quite manifest that he has brought great ability and acumen and industry to bear in the interpretation of those strange Inscriptions. He has constructed an alphabet in Ogam characters, consisting as it does of "strokes—almost exclusively straight strokes—written in a line commonly called the stem-line, which is normally straight." Mr. Nicholson is well aware that, as he has not inserted in his book a photograph of every Inscription to which he refers, or of which he gives an interpretation, he cannot expect as ready an appreciation of his labours and as extensive an acquiescence in his deductions on the part of competent scholars, as would undoubtedly be the case, were every intelligent reader of his book enabled to compare for himself the Ogam Inscriptions with the explanation of them which he has been successful in discovering and which he accordingly communicates. He assigns certain reasons which have prevented him from publishing photographs and fac-similes of the Inscriptions which he has undertaken to decipher and explain. It is evident that Professor Rhys, whose scholarship is well-known, is in active sympathy with Mr. Nicholson in a common desire to shed all the light that may be possible for them, on these curious Ogam Inscriptions that connect us in a certain sense with a past which, however interesting it may be for many reasons, has few trustworthy records whereby an acquaintance with its peoples and doings and political circumstances can be obtained by us. It does great credit to Mr. Nicholson that he has studied carefully the best authorities that are available for understanding the few specimens of early Celtic literature which have been transmitted to us from the early centuries of the Christian era. He has made himself familiar with Zeuss' Grammatica Celtica and with the Goidelica and other books which Whitely Stokes has edited. There is no exaggeration in the praise which Ebel, the editor of the second edition of the Grammatica Celtica bestows on those two great Celtic scholars: "Post ipsum conditorem ac parentem grammaticæ Celticæ haud facile quisquam invenietur, qui melius meritus sit de omnibus hujus doctrinæ partibus quam Whitleius Stokes." Mr. Nicholson has conclusively shown that the language of these Pictish Inscriptions is Gaelic, and that so far as the argument which is thus available is concerned, it goes to uphold the theory that the Picts were Gaels, and that their language was Gaelic. He does not overstate the value of his interpretation of the

Pictish Inscriptions when he remarks: "But that the language of those inscriptions is simply old Gaelic is a fact which will not henceforth be doubted by any Keltic scholar who reads this book," etc.

It has been wisely asserted, that "it is a long time ago since the first Celts crossed the sea to settle in Britain. Nobody knows how long, and the guesses which have been made as to the date are hardly worth recording. And when they did come, the immigration was not all over in one year or even in one century. The Goidels were undoubtedly the first Celts to come to Britain, as their geographical position to the west and north of the others would indicate, as well as the fact that no trace of them on the Continent can now be identified. They had probably been here for centuries when the Brythons or Gauls came and drove them westward. The Goidels had done the same with another people, for when they came, they did not find the country without inhabitants. Thus we get at least three peoples to deal with—two Celtic and one pre-Celtic."

In his Life of Agricola, Tacitus thus writes; "Namque rutilæ Caledoniam habitantium comæ. . . . Silurum colorati vultus, et torti plerumque crines, et posita contra Hispania, Iberos veteres trajecisse easque sedes occupasse, fidem faciunt." Isaac Taylor has the authority of Tacitus on his side when, in his Origin of the Aryans, he thus writes, (p. 76): "There can be little doubt that the Iberian race was dark in complexion, with black hair and eyes. As to the Celtic race, it is almost certain that they were fair with red or yellow hair and blue or blue-grey eyes. The Iberians were plainly the primitive inhabitants of Britain. The Celts were later invaders who were not only a more powerful race but possessed a higher civilization. The Iberians extended over the whole Spanish peninsula as well as over the coasts and islands of the Mediterranean. The Celts when they invaded Britain, found the country in possession of the Silurian race whose descendants can be traced to Denbighshire and Kerry."

The account which Bede gives in his Ecclesiastical History of the Inhabitants of Great Britain and Ireland, possesses a peculiar importance. "This island at present contains four nations—the English, Britons, Picts and Latins. At first this island had no other inhabitants but the Britons. The nation of the Picts from Scythia arrived in the northern coasts of Ireland, and desired to have a place granted them in which they might settle. Acting on the advice of the Scots who occupied Ireland, the Picts sailed over to Britain and began to inhabit the northern parts thereof. In process of time Britain, besides the Britons and the Picts,

received a third nation, the Scots, who migrating from Ireland under their leader Reuda . . . secured to themselves those settlements among the Picts which they still possess. From the name of their commander they are to this day called Dalreudius, for in their language Dal signifies a part." It is added in a footnote: "Hence Dalrieta or Dalreuda may be explained Dal-Ri-Eta, the portion of Reuda or Rieta, *i.e.*, King Eta."

In his De Bello Gallico, L. 5, Cæsar thus writes: "Omnes vero se Britanni vitro inficiunt quod cæruleum efficit colorem atque hoc horridiore in pugna aspectu." We may infer on the authority of Cæsar that the inhabitants of Britain in his time painted themselves with a dye that they extracted from woad. The designation *Picti* or painted men, would thus be applicable to all the tribes of Britain of whom Cæsar had any knowledge. It was about the year 360 A.D., that those who were subsequently known as the *Picts* of Scotland received the distinctive appellation of *Picts* to distinguish them from the Scoti or Scotti. In his Dissertation on the Poems of Ossian, MacPherson contends that it is absurd to suppose, that the name of Picts was given by the Romans to the Caledonians, who possessed the east coast of Scotland, from their painting their bodies. According to MacPherson, "Britons who fled northward from the tyranny of the Romans, introduced painting among the Picts. Owing to that circumstance, it has been held that the Picts were thus designated for the purpose of distinguishing them from the Scots who never had that art among them, as well as from the Britons, who discontinued it after the Roman conquest." The Picts called themselves Cruithne. Their original settlements appear to have been in the Orkneys, the north of Scotland, and the north coast of Ireland or the modern counties of Antrim and Down. A certain writer affirms that the Scots came originally to Ireland, one of whose names from the sixth to the thirteenth century was Scotia. It was called Scotia Major, after part of northern Britain had acquired in the eleventh century the same name. The transfer of the name Scotia to what is now known as Scotland was ultimately due to the rise and progress of the tribe called Dalriad, which migrated from Dalriada in the north of Antrim to Argyll and the isles in the beginning of the sixth century. A difference of opinion obtains as to whether the habit of painting their bodies prevailed among the Scoti of Ireland as well as among the Picts of Scotland. Cruithne or Cruithing involves the root Cruth which signifies form. Cruithneachd, the Gaelic word for wheat can easily be regarded as compounded of *Cruth* form and *sneachd* snow, the word thus signifying etymologically the form or appearance of snow, out of regard, doubtless, to the whiteness of the flour which is extracted from wheat. Professor Rhys, with

apparent correctness, derives Cruithing and Prydd from Cruth and Pryd respectively, which mean form, and as Duald MacFirbis believes, "a people who painted the forms (Crotha) of beasts, birds and fishes on their faces, and not on their faces only, but on the whole of the body."

Scoti was supposed to be identical with Scuit or sguit, a wanderer, and therefore to indicate the erratic life or nomadic life which the Scots pursued. An ingenious etymology has recently been advanced which finds the true explanation of Scoti in the Welsh word ysgwthr, a cutting or carving, and ysgythru, to cut or prune. Examples occur, it is maintained, where the Welsh word means to dye or to paint. If that derivation be adopted, the term Scoti or Scotti would mean painted men, or at least, those who were cut or scarred. The Scoti were largely confined to Antrim and Down in the north of Ireland. The Scoti crossed over from that portion of Ireland, and founded in Argyllshire the Kingdom of Dalriada, Dal Riada, or Righ Fhada. Fergus, the son of Erc, with two of his brothers, led the colony of the Dalriads into Argyllshire and founded the Scottish monarchy there in 503 A. D. His successor was his son, Domangart, who was followed by his son Comgal, the father of Conal that gave the Island of Iona to St. Columba. The Scoti in Dalriada were separated from the northern Picts by Drumalban, the Dorsum Britanniæ. The southern Picts occupied the eastern portion of Scotland from the Firth of Forth towards Aberdeen and the Grampians. The inference can be drawn from the Anglo-Saxon Chronicle that the Picts were warlike and powerful. "In 443 A.D., the Britons sent over the sea to Rome and begged for help against the Picts. In 449 A.D., Vortigern, king of the Britons, gave land to Hengist and Horsa on condition that they should fight against the Picts. In 565 A.D., Columba, a mass priest, came to the Picts and converted them to the faith of Christ. They are dwellers by the northern mountains. And their king gave him the island which is called Ii. In 681 Tumbert was consecrated Bishop of Hexham and Trumwine of the Picts; for at that time they were subject to this country." Columba, himself a descendant of Niall of the nine hostages, was nearly related to the royal family of the Scoti of Dalriada, and was instrumental in placing Ædan, the great-grandson of Fergus Mac Erc, on the throne. These statements are made by Bede in his Ecclesiastical History regarding St. Columba: "In 565, Columba came into Britain to preach the word of God to the provinces of the northern Picts, who are separated from the southern parts by steep and rugged mountains. The southern Picts, who dwell on this side of those mountains, had long before embraced the truth by the preaching of Ninias. Columba came into Britain in the ninth year

of the reign of Bridius, who was the son of Meilochon and the powerful king of the Pictish nation, and he converted that nation to the faith of Christ by his preaching and example; whereupon he also received of them the aforesaid island for a monastery. Now, Columba was the first teacher of Christianity to the Picts beyond the mountains northward and the founder of the monastery in the island Hii which was for a long time much honoured by many tribes of the Scots and Picts." It is said that the dominion of Brude or Bridus extended from the Forth to the extremity of Caithness and the Orkneys. Brude died in 586, having reigned thirty-eight years. His successor Garnard and all the following kings of the Picts were Christians. Columba founded many monasteries in Ireland. He was the teacher of the British Scots and the apostle of the northern Picts. He became the chief ruler both of the Scottish and Pictish church and at the same time exercised great authority in Ireland.

The Book of Deer possesses a unique importance in Gaelic literature. It was discovered and secured by Bishop Moore of Norwich, whose library was presented to the University of Cambridge some hundred and fifty years ago. The Librarian of that University found it in the library, and through him it was brought to the knowledge of the literary world. In addition to its other contents, it has an account of the foundation of the old monastery of Deer. An edition of the Gaelic portions at least of the book has been published by the Spalding Club, under the able supervision of Dr. John Stuart. Whitley Stokes, in his Goidelica, gives a translation of the six Gaelic entries in the book, believing as he does that the philological value of the book lies in the Gaelic portions of it. The first sentence of the entry that narrates how the monastery was founded, is to this effect: "Columcille agus Drostan mac cosgreg adalta tangator ahi marroalseg dia doibh gonic abbordoboir agus bede Cruthnec, robo mormaer buchan araginn agus efse rothidnaig doibh ingattirag sain insaere gobraith o mormaer agus o thosec," *i.e.*, Columcille and Drostan, son of Cosgrach, his pupil, came from Hi (Iona) as God had shown to them, to Aberdeen; and Bede, the Pict, was grand steward (or Mormaor) of Buchan before them, and it was he that gave them that town in freedom for ever from Mormaor and toiseach."

The Gaelic which the Book of Deer contains is unmistakably the Gaelic of the Highlands of Scotland. It is difficult to determine with accuracy where the book in question was written. At any rate, whether it was written in the ninth century or not later than the twelfth century, it must be regarded as setting forth the tradition in reference to the founding of the monastery of Deer. In his elaborate work, *Celtic Scotland*, Skene traces the gradual growth and subsequent power and

importance, of these officials who are mentioned under the appellation of Mormaor or grand steward and toiseach or chieftain. No valid reason is available to dispute the accuracy and consequent reliability of the tradition that St. Columba and Drostan founded the monastery of Deer in the manner which is detailed in the book. The language, though partaking of the peculiarities which attach to all the oldest specimens of Gaelic that are extant, is purely Gaelic, and, as the book purports to give and reproduce the very words of Columba, *e.g.*, "Rolaboir Columcille bedear ainm o huun imace," the inference is plausible enough that Gaelic was the language which Bede, the Pict, and the Picts spoke who resided in that part of Scotland, and with whom, in virtue of his position as Marmaor, he had intimate relationship. Cruithne, the ordinary term which was applied to the Picts in the sixth and subsequent centuries, is in the Book of Deer applied to Bede, the Mormaor, who made a present of the town to Columba. The fact that certain proper names occur in the Gaelic portions of the book, which are not known otherwise in Gaelic nomenclature, does not invalidate the argument which can be deduced in favour of the contention, that the language of the northern Picts, who were contemporary with St. Columba, was Gaelic, identical with the language which the Gaels of Scotland have always spoken. Than Skene, the talented and painstaking author of Celtic Scotland, no one can speak with greater authority in connection with all questions affecting the Picts and Scots. His emphatic language is: "We cannot point to any spoken language in the island which can be held to represent Pictish as a distinctive dialect. The Cruithnigh to the beginning of the seventh century, formed with the Picts of Scotland, one nation. During the whole of their separate existence, the Irish annals do not contain a hint that they spoke a language different from the rest of Ireland."

It is unnecessary to follow the political fortunes of the Dalriads and the Picts, until they were united to form one kingdom under Kenneth MacAlpine in 844. It has been reasonably held, that the union of the Picts and Scots under one sovereign formed an important era in the history of Scotland. The whole of Scotland, north of the Firths of Forth and Clyde, was welded into one kingdom which was never afterwards broken up into separate principalities. The life of the Scottish court flowed on amid many diversities of fortune, and Gaelic continued to be the language of the court until the reign of Malcolm Canmore, who married the Anglo-Saxon Princess Margaret in 1070, and transferred the court and capital from Scone to Dunfermline, thereby terminating the honourable position which the Gaelic language hitherto possessed as the

language of the kings and queens of Scotland. Malcolm had little or no education. He acted as interpreter between Queen Margaret and his Gaelic subjects, seeing that he was able to converse with equal facility in English and in Gaelic. It is with some Gaelic elements of sadness to be admitted, that the reign of Malcolm was in reality the commencement of a revolution in the language and people as well as in the laws and manners of northern Britain. The Albanic Duan is an important relic of Gaelic literature. It is to be found in the Chronicles of the Picts and Scots. It is supposed to have been taken from the MacFirbes MS. in the Royal Irish Academy. It is said to have been sung by the Gaelic bard of the royal house at the coronation of Malcolm Canmore. It narrates in detail the names of those who preceded Malcolm in the kingly office in Albion. It is the oldest and most authentic record of the Scottish kings. Its Gaelic is very similar to that of the Book of Deer. This reference to the Cruithne occurs in it :

Cruithnigh ros gabhsad iarrtam,
Tar ttiachtain a h-Erean mhuigh.
X righ tri fichid righ ran.
Gabhsad diobh an Cruithean chlar.

The Cruithne took it (i.e. the land of Alban) after that
On coming out of Erin of the plain,
Seventy noble kings of them
Took the Cruithnean plaid.

May not the consideration that the Albanic Duan, setting forth as it does the genealogy and names of the kings of Scotland, is written in Gaelic, lead of itself to the strong presumption that all the kings, whose names and lineage are mentioned spoke Gaelic, and that Gaelic was the language of their court and people down to the time of Malcolm Canmore ?

Pictish words survive, that reveal their Gaelic lineage at a glance. Much used to be made of Peanfahel which Bede mentions as being the name of Abercurnig (Abercorn), in the Pictish language.

Peanfahel can readily take on a Gaelic garb, and appear as Ceann â bhalla or the head of the wall. P and c are convertible letters in Gaelic, and so are b and f; and such being the case, there is no reason whatever for hesitating to regard Peanfahel as a purely Gaelic word. Such Pictish words as Bede, Bred, Brude, Canaul, Cartit, Cruithneach, Ceannaleph, indicate a very close affinity, if not an absolute identity, with the normal Gaelic of Albion. Ceannfota is Ceannfada or long head ; Cinnoch cinic, is Cinneach tribe or nation : Donnel Domhnull is Donald ;

Domelch Domnach is Domhnach, Sunday; Elfin is Alpin Alp fhonn, the country of the hills; Fingean appears, in MacKinnon, MacFhingein. Flocaid, Fodla, Atholl, Atth Fodhla, the ford of Fodhla; Fodhla was an ancient name of Ireland. Loc is laoch, a hero; Mailcun is Maoilchon, the servant of Conn; Nectan appears, in MacNaughton; Onnist and Unnist appear in Aonghas, Angus; Scolofthe appears in Sgalag, a farm-servant. Salen is to be found in Salen, a topographical word in the Island of Mull, Argyllshire, which means Sail fhonn, or the land or place of the salt water. Uven seems to find its counterpart or equivalent in Eoghann, the Gaelic word for Hugh or Evan. Were it possible to discover many more words of an unmistakably Pictish character, it may, with no small assurance, be presumed that they would reveal a much closer similarity to Gaelic than to Welsh, or to any other language whatsoever. Who, then, were the Picts, and what was the language which they spoke? They belonged undoubtedly to the Gaels or Goidels, who were the first among the Celts to come from the Continent of Europe into what is now known as Great Britain and Ireland. There is no evidence that is worthy of any serious consideration, to prove, that they belonged to a later invasion, and that their appearance in Albion is to be traced to a much later date than that of the Gaels and Cymru. Rather it is to be asserted with no feeble certainty, that the Picts of Scotland are to be regarded as the descendants and representatives of the earliest Gaels who entered Albion and who absorbed or incorporated with themselves whatever people, if any, whether Iberian or otherwise, who preceded them in the occupation of Albion during the infantile days of human immigration. The brave Caledonians who, under the leadership of Galgacus, fought against the Romans under Agricola, might with abundant propriety have borne the designation Picts as well as Caledonians. No better etymology can be advanced for Caledonia than Dun nan Gaidheal, or the hill or fortification of the Gaels, a name which is perpetuated in Dunkeld. Scholars from whom better things might, in all reasonableness be expected, have allowed themselves to be confused and led astray by separate names, by means of which, whether with or without reason, a people that was virtually one and the same amid all political vicissitudes, came to be described and recognized at various stages in its history. It is difficult at this distance of time to realize how in the far off days, what are now known as Scotland and Ireland, were peopled by Gaels, who owned the same lineage and who spoke an identical language, and between whom there was a constant inter-communion, as if in very truth they lived in one and the same country. All the evidence that is available, and that can be adduced, goes to prove that the Picts were

Gaels—Gaels in language, Gaels in character, and Gaels in their rightful determination to regard Albion as their ancestral home, and to act on the belief, when they fought and put forth their prowess in the strife of arms, that they were in very truth fighting pro aris et focis. Mr. Nicholson, by his indefatigable labours and by his wonderful success in interpreting the Ogam Inscriptions which are to be found, so far as Scotland is concerned, in localities where the Picts are known to have had their homes in the days of old, has done much, and very much, for which he is entitled to receive the gratitude of Gaels everywhere—to furnish corroborative evidence of a very rare and cogent character that the Picts were Gaels, that Albion was the country of their ancestors, that their language and traditions were purely Gaelic, and that their position among the historical peoples of Great Britain and Ireland, is very honourable, by reason of its very antiquity, is illustrious owing to their being the descendants of the earliest Gaelic occupants of those countries, and is henceforth to be acknowledged as the position of a people that was Gaelic in language, in traditions, in country, and in everything that is characteristic of the Scottish Gael of several centuries ago.

THE FUNCTION OF INDIRECT VISION AND THE USE OF COLOURED AND SMOKED EYE GLASSES.

By A. Kirschmann, Ph. D.

(Read April 24th, 1897).

The proposition that the sensibility of the retina decreases from the *fovea centralis* toward the periphery is still seen now and then in text books on Physiological Optics. This statement shows not only a careless misrepresentation of facts which can be observed in our daily experience, and an entire lack of understanding of the extremely elaborate adaptation of this sense organ to the difficult function which it has to perform, but it also involves a logical error, for those who make such a statement either do not see that the retina has different functions to accomplish, thus requiring a special sensibility in each of these functions, or they assume that if the peripheral retina is less sensitive for one quality of the impressions it must be less sensitive for all. They also seem to assume that the conditions which prevail on the eccentric retina are of the nature of an imperfection, or a less complete development.

The negligent way in which indirect vision has hitherto been treated, even in the most celebrated works on Physiological and Psychological Optics, has borne evil fruit of which I may here give a simple example. In Germany they are about to replace the customary German type with the Roman, on the ground that the latter has simpler forms and can therefore be more easily distinguished. This contention contains the silent assumption that all reading is done by means of direct vision, that is, that all single letters are successively projected on the *fovea centralis*. This, however, is not at all the case, for we do not let the fixation point wander from letter to letter as a child does in its first reader, but the fixation point jumps from word to word, fixing in each a letter at random and seeing all others indirectly. (This circumstance accounts also for the fact that we overlook mistakes in printing so easily, especially when the subject matter is familiar to us). Thus we see that reading does not require direct vision only, but it depends even for the greater part on indirect vision. In fact, with indirect vision alone with a little practice we could manage to read tolerably well, but

with direct vision alone the reading could never exceed a slow spelling of the letters. Hence, if we speak of the use of certain kinds of type we have to ask not only which forms are the most easily recognized when viewed directly, but we have also to examine at what distance from the fixation point they can be recognised. Some rough trials which I made some time ago showed that the Roman capitals with their marked simple geometrical configuration are decidely superior to the peculiarly shaped German capitals. But, on the other hand, the small German letters, although they are more complicated in their forms, seem to be, on account of their marked prominences, and their cornered appendices above and below the line, superior to the Roman letters. The latter are too much rounded and at a short distance from the centre nearly all look alike. Further, in the German letters, the different forms of "s" at the end and at the beginning of root syllables and special combinations for "st" and "sz" give greater variability. It seems to me also, that the repetition of forms in the small Roman letters is too great, "b," "d," "p" and "q" are exactly the same form placed in the four quadrants of rectangular co-ordinates, in a plane.

The above misrepresentations concerning the function of indirect vision have their origin with those Scientists, who in trying to make the results of Science digestible to the public, are inclined to state everything as "explained." As a consequence of this, things which are not understood are very often said to be imperfect. Such has certainly been the case when the "imperfection" and "inferior development" of the eccentric retina are spoken of. Some even go so far as to say that the peripheral retina is undeveloped because of a lack of exercise of its activities. Those holding this view do not see that it is very questionable whether an eye whose retina had not the difference between direct and indirect vision would be more serviceable than one which had these differences. I think such an eye would be a very imperfect sense organ, and this is in accordance with the general principle which is observed everywhere in nature—viz: The higher an organism is developed the more the qualitative division of labour is applied in its constituents. In certain cases we seem to find a deviation from this principle in higher organisms, for example, in the fact that we have two eyes; but a closer examination will show that this same principle is fundamental in these cases also. Binocular vision is not for the purpose of securing twice as much light intensity as one eye could give. This is clearly proven by Fechner's paradox experiment, which shows that when one eye sees the full light, the intensity of the sensation is *diminished* when a certain amount is

added from the other eye. Further, the function of Binocular vision is not especially to increase the vision field; it is rather for the purpose of seeing objects from two different standpoints.

The principle of the qualitative division of labour is, however, directly demanded by the general constitution of consciousness. The facts of consciousness at any time are not all equally prominent, for while all sensations present are *perceived*, only a very limited number are *apperceived*, that is, but few are in the "gravitation point" of our attention. Since sensations of sight play the foremost rôle in the presentational side of mental life it is almost imperative that the manifoldness of light impressions given at any moment should conform to this general constitution. We might, therefore, assume *a priori* that a highly developed visual organ cannot have an arrangement of its elements like the facetted eyes of the insects (which are a striking case of quantitative division of labour), but rather an arrangement in which each element is to perform its functions in a way different from the other elements. We may then expect that the central part of the retina will be superior to the peripheral regions in some respects and inferior in others.

Our sense of sight has to apprehend brightness, (light intensity), colour quality, space configuration (shape and size), and changes of the latter, *i.e.*, movement. It is well known that eccentric is far inferior to central vision in the distinction of discrete points and the perception of spacial forms, and also it is known that the manifoldness of colour qualities gradually decreases with the approach to the periphery until a zone is reached in which no colours are perceived at all. It must be noticed, on the other hand, that in the detection of movement, indirect is far superior to direct vision. This is the reason that moving objects so easily draw our attention, even when the objects are small and the movement slow. The most striking case of the superiority of indirect visión, however, is found in its greater sensitiveness to light intensity. In this case indirect vision is physically at a certain disadvantage as compared with direct vision. If we have a number of lights of equal brightness at equal distance from the eye, but in different parts of the vision field, the retina images of them will not be of equal brightness, but will be brighter the nearer they are to the *fovea centralis*, for the light which becomes effective in each case is a pencil of rays whose angular value is measured by the projection of the pupil on the plane which is normal to the incidence, in other words the intensity of the retinal image is proportional to the cosine of the angle of incidence. The more oblique these cones stand in relation to the pupil the less light

they represent. Thus we see that physically considered the eccentric retina receives less light than the central part, and yet we do not notice anything of this deficiency. If we look at a uniformly illuminated surface it does not appear to us as it should according to the optical nature of the retinal image, that is, darker at the edges and brighter in the centre, but it appears uniformly bright. On closer examination it has been shown that the light intensity becomes even a trifle greater toward the periphery. Thus the eccentric retina, as compared with the centre, seems to have a greater sensitiveness to light, which not only makes up for the physical decrease in the brightness of the retinal image, but even over-compensates the latter a little. This over-compensation has been experimentally ascertained by myself for ordinary conditions of illumination,* and in the case of adaptation for the dark by Dr. A. E. Fick.† Now this over-compensation is by no means an accidental affair, as its high proportionate value proves, it certainly serves a certain purpose. Our eye is not only a most accurate optical apparatus, but it is also a motory mechanism of the highest precision. Motion is of the very nature of the eye, and the qualitative division of labour of the different parts of the retina, to which corresponds the gradual differentiation of indirect vision from the fixation point outwards, seems to be established chiefly with regard to these motor functions. As a rule we pay attention to that part of the vision field whose image is projected on the *fovea centralis* and its immediate surroundings. To this fact Wundt has given the name "coincidence of apperception and fixation." This rule, however, is transgressed in every case in which we give our attention to a point in indirect vision, or, in other words, whenever we change the direction of our attention. Whenever a change of light intensity or of space configuration occurs in indirect vision there is a tendency to bring the new impression into the fixation point. This function of the visual organ will be more perfectly carried out the more prompt the peripheral regions of the retina react. Thus the greater sensitiveness of indirect vision will not only foster the efficiency of the motory mechanism of the eye, but it will, so to say, condition it. It is, therefore, the greater sensitiveness of the eccentric regions of the retina for light intensity and movements, which makes the eye respond so readily to even the slightest changes in configuration or brightness occurring in eccentric parts of the vision field.

We, therefore, recognize on the one hand, the superiority of the

*Kirschmann—Die Helligkeits Empfindung in Indirecten—Sehen. Philosophische Studien, Vol. V., p. 417ff.

†A. E. Fick—Studien uber Licht und Farben Empfindungen. Pfluger's Archiv, Vol. 43, p. 441ff.

central retina for the perception of forms and colours, and on the other the superiority of the eccentric retina in sensitiveness to light and to changes in space. These supplement each other to make the eye what it is, and injury to either is equally harmful to the efficiency of the sense of sight. The peripheral retina *must* be more sensitive to light, and if we prevent it from exercising this function we will injure the motory mechanism in the most vital way. Such injuries will be induced by all those artificial optical arrangements which give advantages of any kind to direct vision at the expense of the light intensity offered to indirect vision. All kinds of smoked and blue or otherwise coloured glasses which absorb the rays destined for direct and indirect vision in unequal ratio, must be classed as harmful arrangements of this character This is especially the case with concave glasses which are smoked or coloured throughout. The rays which are transmitted through the centre of these glasses to the central regions of the retina suffer less absorption than those rays which, coming from the side, have to pass through a considerably greater extent of absorbing medium. The indirect vision in this case, is, therefore, at a disadvantage, and its movement-inducing function will be greatly damaged, for the peripheral parts do not get the necessary amount of light to give the characteristic impulses for directing the eye towards the objects concerned. Therefore *concave glasses which are coloured throughout should* NEVER BE USED, *aud the prescription and sale of them should be prohibited.* If, however, correction of the refractive state of the eye, and protection against high intensities are required at the same time, the two conditions should either be met by separate glasses, or, if this be impracticable, the glasses should not be coloured throughout, but should be composed (after the manner of achromatic lenses), of a perfectly colourless concave part of the proper refraction power, and a coloured part with parallel surfaces, having the refractive power zero.

COUNTING AND TIME RECKONING.

By John Thorburn, LL.D.

(Read April 24th, 1897).

N.B.- As some of the letters and characters meant for this paper are not in common use, it has been found necessary to use others approximately like them.

The system adopted by different nations for recording events prior to the introduction of what are generally known as the Arabic numerals varied greatly, and, as might naturally be expected, was in most cases extremely primitive, and not unfrequently complicated, especially when the art of writing was unknown, or but partially practised. Nor can we wonder at this, for in comparatively recent times, we find uncivilized tribes whose knowledge of numbers is so limited that it is difficult to imagine how, except for a very brief period, they can keep trace of past events. The faculty of counting seems to be one of the last to be exercised and developed, and hence we find that, even among nations well advanced in civilization, and with a considerable amount of intellectual advancement, their range of using numbers is comparatively restricted. As has been well said, the power of accurately estimating and correctly expressing any considerable numbers is one of the most striking evidences of civilization, and complications of words in the expression of small amounts must be deemed evidence of great intellectual inferiority.

Sir John Bowring, whose work on the decimal system contains a large amount of curious information, and to whom I am largely indebted for matters relating to this subject, mentions that the method of employing the fingers, hands and feet can be traced in the numerals of many of the aboriginal tribes, both on this continent and elsewhere, and that, owing to the complex and cumbrous character of their languages, they were prevented from extending their numerical calculations beyond a very limited range, and we are not surprised, therefore, when we are told that one of the tribes on the Amazon break down when they come to 3, which they call *paettarrarorincoaroac.* Probably the main reason why, among rude and uncultured nations, so much use is made of the fingers and toes, and why they play so important a part in expressing numbers, is because they are at all times ready at hand and available to make

calculations. Not unfrequently, at the present day, we see persons making use of their fingers in adding numbers. Our word digit, in its Latin signification, as is well known, has both the meaning of finger and of an arithmetical number, and in German *zehen* means both tens and toes, indicative of the fact that, no doubt, the Romans and the ancestors of the Germans at one time made use of this primitive method of counting. Dr. S. R. Riggs in his Dakota Grammar says that the Dakotas use their fingers in making their calculations, bending them down, one after another, as they proceed, till they reach 10, when they turn down a little finger to remind them that one ten has been disposed of, and then commencing again, they go through the same process till they again reach 10, when down goes another finger and so on. When they wish to express 11, they say *wickcemna sanpa wanzidan*, literally "ten more one;" 12 would be *wickcemna sanpa nonpa*, that is "ten more two," and so on till they reach 19, which is *unma napcincoanka*, "the other nine;" 20 is *wickcemna nonpa*, meaning "ten two" or "ten again;" 21, *wickcemna nonpa sanpa wanzidan* $=(10\times 2)+1$. Their mode of expressing the year 1897 would have been: *kektopa-winga opawinga sahdogan sanpa wickcemna napcinwanka sanpa sakowin* $=1000+(100\times 8)+(10\times 9)+7$. We are told that, in early times, the native tribes of Australia could only count as far as 3, and when they wanted to express a larger number, they had either to raise their hands or make use of a term meaning "multitude." Dr. Peacock gives examples of similar cases among tribes on this continent. He states that the Betoi, who formerly dwelt on the banks of the Orinoco, used the word *edojojoi* for 1; for 2 their word was *edoi*, signifying "another;" 3 was expressed by *ibutu*, "beyond;" 4 by *ibutu edojojoi*, "beyond one;" 5 was *rumoscoso*, signifying "hand." We are also told of another tribe, who are said to have been able to count as high as 30, but in doing so, they used combinations of the first four numbers, and of the words for hands and feet to express the higher numbers. Thus with them 1, was *petey*; 2, *mocoi*; 3, *inbohassi*; 4, *irundi*; 5, *irundi hae nirai*, that is "four and another," or *ace popetai*, "one hand;" 6, *ace popetei hae petei abe*, "a hand and one besides;" 9, was *ace popetei hae irundi abe*, "a hand and four besides;" 10, *ace pomocoi*, "two hands;" 20, *mbo mbi abe*, "hands and feet besides;" 30, *mbo mbi hae pomocoi abe*, "hands, feet, and two hands besides." It is difficult to imagine how, with such complicated modes of expressing numbers, these nations could have had any intelligible system of chronology. The Dakotas in reckoning time were said to have counted their years by winters, such and such an event having happened so many winters ago. Another peculiarity with them was, when they

wanted to say how long they would be absent, or when a thing would happen, they would say so many nights or sleeps, not so many days—their months being counted by moons. They had the idea that when the moon was full, a large number of mice attacked it, nibbling away at it till the whole was eaten up. When the new moon again made her appearance and became full, the same nibbling process recommenced. Five moons were apportioned by them to the winter, and five to the summer, whereas the spring and autumn had only one each. January had with them a name signifying "the hard moon;" February, that of "the racoon moon;" March, that of "the sore eye moon," and so on. As the twelve lunations did not fill up the year, they would, no doubt, find it difficult to decide what month it was, and probably had heated discussions over the question.

The Kaffirs of South Africa also regulated their years by the moon, and indeed, this was usually the case with all rude and uncivilized nations. They kept count of time by notches cut in pieces of wood, and their recorded dates, we are told, seldom extended beyond one generation, or at most a comparatively limited time. It would seem as if the exchequer tallies, formerly used in England, and which were abolished by 25 George III., were a survival of this ancient practice of assigning numerical values to these scores or notches.

According to Dr. Brinton, the Algonkin nations usually preserved their myths, chronicles and important events by means of marked sticks. The name, it appears, given to these records or tally sticks was among the Crees and Chipeways, *massinahigan*, which is now their common name for book, but it originally meant a piece of wood marked with fire, from the verb *masinakisan*, "I burn a mark on it." In subsequent times, instead of burning marks on sticks, they painted them, drawing figures upon them to which they attached distinguishing conventional meanings. Dr. Brinton further states, that the practice of using such sticks painted or notched was in common use among the Southern tribes of North America, and that the natives of South Carolina transmitted their records by means of bunches of reeds of different lengths, having various distinctive marks which only the initiated could understand.*

We are told by Brantz Mayer, that the Aztecs and other early inhabitants of South America made use of picture writing in recording events which were supposed to have some special interest or importance. The Spaniards, however, when they landed among them ruthlessly destroyed these wherever found, looking upon them "as symbols

* "The Lenape and their Legends," by Dr. Brinton.

of a pestilent superstition." This we are told was done with the sanction and under the direction of Zumaraga, the first Archbishop of Mexico, who doubtless considered them as devices of the evil one, and thought that, by consigning them to the flames, he was doing good service to the cause of religion. It is greatly to be regretted that these interesting records had not been carefully collected and preserved, as they would no doubt have thrown much light upon the history of those early times among that interesting people. Fortunately, however, a number of them escaped the general destruction, and were deposited in several of the European Libraries.

According to Mr. Murdock in his notes on counting and measuring among the Eskimo, they must find it difficult to keep track of time. They are not in the habit, we are told, of using numbers above 5. 6 and all higher numbers are called *anadraktuk*, signifying "many." When they wish to express 6, they say "five and once on the next hand;" 7 is "twice on the next;" 9 is *kodlin oteila*, probably meaning "that which is not ten," (ten being *kodlin*, signifying "the upper part," referring to the digits on the hand). They reckon the year by moons, commencing with the first one after the freezing over of the Elson Bay, when the women begin to sew deer skins. This first one is called *Shud-le-wing* "the time for working." Their third one, which nearly corresponds with December, is called *Kai-wig-win*, "the time for dancing." When anything has taken place more than four or five years before, they are in the habit of saying *aipani*, that is "in the other" (time). From this it will be seen, as Mr. Murdock justly remarks, the expressions used by them for past time are too vague to make it possible to learn the date of any event in their history. So far as I can learn, our Indians in the Northwest, prior to their coming in contact with the whites, were in an equally benighted condition, having had no system whatever for recording past events, except what they were able to retain in their memory, and that could only be for a comparatively limited period.

The ancient Peruvians had a curious method of recording events by knotting strings, or as they were called *Quipos*, meaning cords. 1, was represented by one knot on a thread; 2, by putting the end of the thread through a second time, making what we would call a double knot; 3, was expressed by a treble knot; 4, by a certain kind of loop; 5, by the same kind of loop with an additional twist; 6, had a second twist given to the loop, and so on, by some new contrivance in the process, till 100 is reached, a new knot being used at every third numeral, the two following ones being expressed by additions at the

clinch, or part where the whole is tightened. As may be easily imagined, before this happened, the knots became extremely complicated. It was the duty of persons in every province called *Quipucamayus*, or keepers of the historical *Quipos*, to preserve by these string records the memory of public events, and there were public buildings filled with these threads.* According to Dr. Brinton this method of recording events and of counting and distinguishing their sheep is still in use around Lake Titicaca, the sex and other characteristics being indicated by different colours.†

Dr. Peacock gives an interesting account of how time is recorded by means of Mexican hieroglyphics. He says that they had only distinct characters for 1, 20, 400 and 8,000, yet by a peculiar process of combination they were able to express any number. 1, was represented by a small circle; 20, by a standard shaped as a parallelogram; 400 by a feather, and 8000 by a purse, supposed to contain the same number of grains of cocoa. By dividing the parallelogram or hieroglyphic for 20 into four squares, and giving each a separate colour, they were able to represent 5, 10, 15, and by taking half a feather they could express 200. Their usual method, however, of representing the units from 1 to 19 was by so many small circles, and I believe they had other and more direct ways of expressing their numerals. By the system referred to above, the year 1897 would be given thus:—

⊕ 𝍐𝍐𝍐𝍐𝍐𝍐𝍐𝍐𝍐𝍐𝍐𝍐𝍐𝍐𝍐𝍐𝍐𝍐𝍐 000,000,000,000,000,00.

The Assyrians and other Eastern nations which used cuneiform characters expressed their numbers from 1 to 9 by upright strokes, thus, 1, by 𒐕; 2, by 𒐖; 3, by 𒐗; 4, by $\overset{\text{III}}{\text{I}}$; 5, by $\overset{\text{III}}{\text{II}}$, and so on. 10 was expressed by 𒌋; 11, by 𒌋𒐕; 12, by 𒌋𒐖, 20, by 𒌋𒌋; 50 was $\overset{\text{𒌋𒌋𒌋}}{\text{𒌋𒌋}}$; 100 was 𒌋𒐕-; 1,000, 𒌋𒌋𒐕-; the year 1897 would be thus expressed

$$\underset{18}{\overset{\text{IIII}}{\text{IIII}}\text{<}} \quad \underset{100}{\text{<}^{\text{I}}\text{-}} \quad \underset{90}{\overset{\text{<<<<<}}{\text{<<<<}}} \quad \underset{7}{\overset{\text{IIII}}{\text{III}}}$$

Probably the simplest way of writing numbers is well seen in Babylonian inscriptions, where from 1 to 99 are obtained by a repetition of the vertical arrowhead $\overset{\text{I}}{\text{V}}$ = 1, and a barbed sign < = 10. When a smaller number was put to the right of the sign for 100 ($\overset{\text{I}}{\text{V}}$-), it was added and, what seems singular to us, when it is put to the left, it gives the number of hundreds. Thus $\overset{\text{I}}{\text{V}}$ - < = 110, but < $\overset{\text{I}}{\text{V}}$ - = 1000.

Among the peculiarities in the notation of the Ancient Egyptians may be mentioned the following, that whereas the hieroglyphic characters were written from left to right, in the hieratic, or more modern

* See "Westminster Review" vol. ix. 1820.

† Dr. Brinton, in "Science," January 24, 1896.

form, they were written from right to left. In the hieroglyphics, the units were represented by upright strokes from 1 to 9; 10, by the character ∩, like an inverted u; hundreds by ; thousands by , and so on. Thus, 1897 would have been expressed by . They are said to have regulated their year by the changes of the seasons without reference to the changes of the moon. It contained 365 days, divided into twelve months, but they appear to have found a difficulty in disposing of the five supplementary days at the end of the year. This is not at all to be wondered at.

In more modern times, the Mayas or ancient inhabitants of Yucatan whose system of recording events, as shown by Dr. Brinton, was very complicated, commencing their year on July 16th, divided it into 18 months or moons, of 20 days each, making only 360 days. Their year, however, was 365 days; so to harmonize this discrepancy, they allowed five days, which were called "days of pain or peril" to intervene between the last month and first of the next year, which were not counted. Other South American tribes were troubled with the same difficulty. In the annals of the Cakchequels, it is shown that their year began on the 11th or 12th of February, that it was not measured by lunar months, as was the case with hunting tribes, but it was a solar year, consisting of 20 months of 18 days each. This deficiency of five days, for there were 365 days in their year, was called "days of evil or days of fault." The Mexicans in getting over a similar difficulty used a term signifying "insufficient." *

The Greeks originally expressed their numbers by using the first letters of words. Thus, 1, expressed one, being the initial letter of ἴος, the Epic form of εἷς, which signifies one; π, five, from πέντε; Δ, ten, from Δέκα; *H*, 100, from Ἑκατόν; *X*, 1,000, from Χίλιοι; *M*, 10,000, from Μύριοι; πωϟ a Δ in its bosom thus: ⟦Δ⟧ was 50; with *H*, it was 500. All the Greek inscriptions, prior to the time of Alexander, expressed the numbers by the initial letters of words. Subsequent to this, their dates appear to have been expressed by the letters of the alphabet used as symbols. This was also the case with the Hebrew alphabet. In the notation of both these languages, the letters were taken and used mainly in their alphabetical order, and in many respects resemble and closely correspond to each other. By the Greeks, the year 1897 would be expressed, thus, ϡωϞϠ. By placing an iota under a letter, as will be seen from the example given, its value is increased one thousand fold; by putting the letter M under it the value is increased ten thousand fold; for these letters, however, single or double dots were substituted as more convenient.

* Dr. Brinton on "The Maya Chronicles."

Probably the most familiar use of letters, as numerals, was found as practised by the Romans. With them C, which was the initial letter for Centum, stood for 100, and M from Mille represented 1,000. There seem, however, to have been older forms in use instead of these. Thus, a circle divided vertically ⊕ stood for 1,000, and horizontally ⊖ for 100. From the sign for 1,000, disparted thus, ↀ, still occasionally found in prints, comes D for 500. Another symbol used by them for 100 was Ɔ which has been suggested as the mode of cancelling ten X's, just as X, in the same manner, may have been the way the ten upright strokes for ten were cancelled, thus, [illegible]. The bi-section of this symbol for 100 (Ɔ) gives Ⅰ, or L for 50, and of X, V for 5. Further improvements in course of time were introduced ; IV being used for IIII ; IX instead of VIIII ; XL for 40 ; CD for 400 ; CM for 900, etc. Here, as will be seen, when the smaller number is placed in front, it has a subtractive force ; when placed behind the larger it has an additive force. By the multiplication of the symbol for 1,000 (CIↃ), we get CCIↃↃ = 10,000 ; CCCIↃↃↃ = 100,000, and the bi-section of these, IↃↃ = 5,000, and IↃↃↃ = 50,000. In a Clavis Homerica which I have, the date of publication is given thus, CIↃ IↃ CIV, being 1604. On the 11th May, 1850, an inscription on a brass plate inserted in the foundation stone of New College, London, has this date CIↃ DCCCL.

The introduction of the Arabic numbers worked a marvellous revolution in the modern systems of notation. It is now generally agreed that they were of Indian origin and not Arabic, and were invented by the Brahmins some time before the Christian Era. The Arabs themselves lay no claim to the honour of having invented them, but ascribe them to the Hindoos, while we are told that the Hindoos ascribe the invention of the nine digits (*anca*) to the beneficent Creator of the universe. They were probably first introduced into Europe in the 10th or 11th Century, but it was long before their use was sufficiently appreciated. In manuscripts of the 14th Century, these "new numerals" (called *Gobar*), seem to have been only partially understood, as we find Roman and Arabic numerals hopelessly mixed together, nor was the value of zero (0) at that time known. Thus, we have X, X1, X2, X3, etc., for 10, 11, 12, 13, and we find in regular sequence XXX, XXX1, 302, 303, for 30, 31, 32, 33. We come across also such combinations as X4 for 14, and MD58 (1558), and MDX47 (1647). The first calendar in the English language in which the Arabic numbers are used has the date 1431. The first English book which bears its date in the Arabic numerals was printed in 1478. We find also a curious practice of dividing 8 so as to

make 4, which seems unaccountable, as both were equally well known. Thus, on a calendar on vellum, we have the date in this form ıϱΛ2, (1472), and on a seal the date is 1ϱϬϱ (1484). These, and other peculiarities which might be given in the use of these "new numbers," show that our forefathers, in these early times, were very human, and were somewhat careless and, possibly, somewhat blameworthy in mixing things up in this way.

I may here state, that what led me to think of writing this paper was the fact that, in consulting a number of old documents I brought with me from Scotland, I found dates given which were different from any I had ever seen. These documents consist of charters, receipts, bonds, leases, instruments of sasine, etc. Some of them are in Latin, others are in Scotch as then used, which presents many peculiarities to a modern reader in spelling, contractions and form of letters now obsolete. What, however, particularly struck me was the way in which the centuries were given. The cabalistic letters used puzzled me. I consulted books on palæography, but these at first, so far as I could make out, afforded no help. Fortunately, however, I found the key in some of the receipts which contained the peculiar method referred to, as well as the modern way of expressing dates. For example, the date in the body of one of the receipts showed that rent was paid for the year Jajbiꝯ eighte sex yeres, that is 1686, whereas, "thes pts, (presents) were rend (rendered) and subt, (subscribed) 1687. In another document, signed by the Earl of Wigton, the date is given thus, Jajbıᶜ threscoir yeirs, corresponding to 1660.

In a *carta confirmationis*, signed also by the Earl of Wigton, the date in the body of the document, 1673, is given in the common Latin form, thus: *millessimo sexcentessimo septingentessimo tertio.* Whereas, in the endorsation, it is given in the modern form 1673. In an instrument of sasine, the date 1640, is given Jajbiꝯ fourte yeires. In a receipt, both Jajbi nyntie and 1691 are found; the former for what the receipt was given, the latter when the money was paid. In a lease, or as it was called in Scotland a "tack," the date is given Jajbijꝯ and fiftie five, that is 1755. In another tack, 1774 is expressed by Mvijꝯ and seventy four. In the two following dates 1709 and 1710, it will be noticed that there is a deviation from the ordinary method; the former being Jajbıı ᶜꝯ nine; the latter Jajbıı ᶜꝯ ten. Here c as well as that peculiar character (ꝯ) are both used. At this early period in Scotland, it does not appear that there was any well-established system of writing dates. Sometimes, as has been shown, they are given in Arabic numbers, at other times in Latin, again in Roman characters, and most

frequently in the quaint form now under consideration. I have not met with this last class of dates after the close of the 18th century. The last one I have in my possession is 1799. It is an instrument of sasine, and what is rather singular, the body of the document is written in English; it is certified in Latin by Joannes Wilson, clericus, and the certificate of registration is in English, signed by John Boyes, Jr., "fifth day of April Mvijc and ninety nine years." I have corresponded with a number of gentlemen regarding the meaning of these letters, but I find there is quite a diversity of opinion, no two of them agreeing in all respects. An Edinburgh gentleman, who is an expert in deciphering old manuscripts, says that taking Jajvijc for 1700, the first three letters area corruption of the original Runic form of M = 1,000, then the vij, or as it is given in most of these old writings bij, is 7, and the twirl at the end is a C for centum. Not having a sufficient knowledge of Runic characters, I am not disposed to dogmatize, but I have very grave doubts as to the correctness of this explanation, and I think other evidence will show that I am justified in making this statement. In a letter received from Dr. Dickson, who has only recently retired from the Registry House in Edinburgh, and who is a recognized authority in matters of this kind, he says:—"Your question is one that is very often asked, and yet I do not remember to have seen it explained in any book; of the explanations you suggest, the second is substantially correct. The number 1,000 written ȷ̇ꝛ was by a slight change in the form of the ꝛ written ȷ̇ꝝ. Ignorance then interposed and put a dot over the last stroke of ꝝ, and closing up the first part of it, made the whole jaj; bijc is simply vijc, with an unmeaning terminal flourish (c), common in the 17th and 18th centuries." He further states that these letters are constantly heard used in law offices, read phonetically. With all due deference to Dr. Dickson's superior knowledge of matters of this kind, unless I have misunderstood his statement, I feel disposed to question the sufficiency of his explanation, as he makes no reference to the origin of the first letter (j), and for the following reasons:—In palæographic writings of the 17th and 18th centuries the m is written thus ·ꝛ, without the j preceding it, and by the change suggested by Dr. Dickson, when writers did not know its origin, it might readily become aj. In confirmation of this view, subsequent to receiving Dr. Dickson's letter, I found in the Scottish National Manuscripts, a copy of which is in the Toronto Public Library, a copy of the oath taken by William and Mary on their acceptance of the crown of Scotland, concluding as follows:—"Signed by us at Whitehall the eleventh day of May jajbic four score nyne years." WILLIAM R. MARY R.

In the accompanying printed form of the above, 1689, the date when the oath was taken is given thus j^{m}vi^{c}, etc. I also found other examples of this in the *Acta Parliamentorum Caroli I*, (the Acts of the Parliament of Charles I.). Here is one act in favour of Dame Margaret Graham: "at Edinburgh the ffirst day of ffebruar the yeir of God Jmvjc';" another on page 65 is given thus: "Band to the gflal (general) of Artellierie. Forasmeikle as the commissioneris of the comoun burdens by this their act of the date the nynteenth of August Jmvic' fourtie twa yeers," etc. From this it would appear that the j is merely meant for the number I. This view appears to me to be confirmed by the dates previously given, viz.:—Mvij^{c} and ninetynine years for 1799, and Mvij^{c} and seventy four years for 1774. In a communication from Bernard Quaritch, bookseller, London, I find that he holds this view.

What are we to say about the twirl (^{c}) at the end? Is it meant as the Edinburgh expert says for C, the initial letter of centum a hundred, or is it as Dr. Dickson calls it "an unmeaning terminal flourish?" It would appear from the large majority of cases where this flourish is not associated with C, that probably it was meant to take the place of C, and where it is found coming after C, it may be used, as has been suggested, to prevent further addition or the altering of the date.

In the history of "Biggar and the House of Fleming" there is an inventory of silver work and garments and other things which belonged to Dame Elizabeth Ross, Lady Fleming, and signed by her brother-in-law John Earl of Athol, in 1578, which ends as follows:—"We Johne Erle of Athole, Chancellor of Scotland, etc., Scrivit w^{t}o^{r} hand in Edinburgh ye XXVIII day of october the zeir of God(jav^{c}) thre scoir auchtene zeiris, Erll of Atholl." If this is a correct transcription, it will be seen that there is a difference between it and the other dates previously referred to. the j, which should follow *a*, is wanting and the position of the C is changed. The terminal flourish after the v is also different from the one (^{c}) generally found used, and for these reasons, I confess that I can suggest no explanation except that a mistake was made in transcribing the date.

It is interesting to know that a similar mode of expressing dates was used by the French in the seventeenth and eighteenth centuries. Thus I find that in the "Judgments et Deliberations du Conseil Souverain de la Nouvelle France," 1675 is given gbic soixante quinze, and 1700 gbiic. In this publication, Monday, February 1st, 1700, has gbiic for the last time; in the subsequent dates the modern method is used. The g

here is seemingly only a modified form of ℳ = m. I am not aware that any other country besides Scotland and France has adopted this method of expressing dates, and as to which of these two belongs the credit of having originated this composite form of chronology, it is probably impossible at this late date to decide. In the history of "Biggar and the House of Fleming," there is a curious protest of Robert Fleming against the sentence of death and forfeiture which had been pronounced against his father, Sir Malcolm, written partly in Latin and partly in vernacular Scotch of the time, where the date of 1440 is thus given, M^mo CCCC^mo and fourty zeris. Mons. Silvestre, in his work on "Universal Palæography," mentions that Agnes Sorel who received gifts from Charles VII., gives a receipt as follows:—le XVIII^me jour d'Avril l'an mil cccc quarante huit, that is 1448; the sum received is given thus, ij^c LXXV, l.t. (deux cens soixante quinze livres tournois), and on the tomb containing her remains, the date is le IX jour de fevrier, l'an de grace MCCCC, XLIX (1449).

In the National MSS. of Scotland, there is a Gaelic contract with the date 1614 given in a very peculiar way and probably is unique. It is as follows:—Mil 6. c. ⁊. 4. X. It will be seen that the 4 coming before X contravenes the established usage, as a smaller number preceding a larger one usually lessens the larger one. The character ⁊ is probably a modified form of &, "and."

Sir John Bowring gives some curious examples of how the reform of the Calendar in 1700 was recorded on many medals struck at the time. One has Gere*C*htes *L*oboper *D*enk *M*ah*L*, "The record of merited gratitude;" the larger letters used giving the date thus, MDCLL; another: Geen*D*erten *C*a*L*en*D*ers *D*enkzah*L*. "In remembrance of the reformation of the Calendar, DDDCLL." One has Hoert doch, wunder! Im Jahr MDCC. wusten de leuthe nicht wie alt sie waren. "Listen to a wonder, in the year 1700 people did not know how old they were." The taking by the Spaniards of Ostend in 1704 is thus commemorated in Latin:—*I*tane F*L*an*D*r*I*a*M* *L**I*beras *I*ber, the large letters giving the date MDLLIIII. "Is it thus Spaniard that thou freest Flanders." Another celebrating the peace of 1678 has:—*A* *D*o*MI*no *V*en*I*ens pop*VLI*s pa*X* *L*aeta ref*VL*get $\left(\frac{\text{MDLL.}}{1600}\ \frac{\text{LXVV.}}{70}\ \frac{\text{VIII}}{8}\right)$ translated thus:—"Peace, which is the gift of heaven brings gladness to the people." These are what are called chronograms, a fanciful device used by the later Romans and subsequently introduced during the renaissance period where the larger letters formed the inscription. The following is constructed from the name of the Duke of Buckingham who was assassinated by Felton at Portsmouth:—Georg*IV*s *D**V**X* B*VC*k*I*nga*MI*aê, date $\frac{\text{MDC.}}{1600}\ \frac{\text{XVV.}}{20}\ \frac{\text{VIII.}}{8}$, 1628.

The following are added to show what a diversity there was in former ages in recording dates:—VICLXXXIIII = 684; M^mo. CCCC^mo. = 1400; MCCCCVIII = 1408; mil trois cens XXXViij = 1338; L'an de grace MCCCCXLIX = 1449. The following curious advertisement is taken from an old Almanac :—" Prognostycacyon of Mayster John Thybault, Medycyner and Astronomer of the Emperyall Majestie of the year of our Lorde God MCCCCCXXXiij (= 1533); comprehending the iiij partes of this yere and of the influence of the mone, of peas and warre, and of the syknesses of this yere, with the constellacions of them that be under the Vij planettes, and the revolucions of kyngs and princes and of the eclipses and comets," d.cccc.LXXXVIIII = 989. Mr. Gladstone's visiting book has an entry made by the Archbishop of Syra and Paros, given thus :— $\frac{17\ 29}{30}$ Ἰανουάριον $\frac{1869.}{1870}$ Javragh

In a charter signed by Rogers the first Norman King of Sicily, we have the date 1130 given thus, MCtricessimo indic (tione) VIII. Here as will be seen, is introduced a new element, that of indiction, which was a period or cycle of 15 years. It represented the time during which the annual tax on property was paid on the basis of what was its value at the beginning of each quindecennial period. This system began to be used in reckoning time, chiefly by ecclesiastical historians during the middle ages, and its introduction has been attributed to Constantine the Great. Beginning with indiction 1, it went up to indiction 15, when the series began again. Owing to the fact that the indiction commenced with different days in different countries, there have been various indictions used, such as that of Constantinople, calculated from September 1, 312; that of the Imperial or Cæsarian indiction (commonly used in England and France), beginning September 24, 312; another was that of the Roman or pontifical indiction, commencing January 1st (or December 25, when that day was taken as the first day of the year), A.D., 313. The indiction of any year of the Christian era could be found by the following rule :—Add 3 to the year (because A.D. 1 = indiction 4) and divide by 15. If nothing remains the indiction will be 15; if there is a remainder it will be the number of the indiction. Manuscripts during the middle ages were dated in various ways—as for example :—By the year of the Christian era, by the regnal year of the reigning sovereign or pontiff, etc., etc. In England, it was the usual practice to date charters and other legal documents by the saint's day or festival nearest which the deed was executed and the year of the king's reign. A great deal of confusion has arisen, not only as I have said, owing to the different days on which the year commenced, but

also to the fact that in many cases these were changed. Thus, in England and Ireland, from the 6th century to 1066, the new year commenced with December 25th, and sometimes from March 25th. After the Norman conquest to the year 1155, it began with January 1st, and between 1155 and 1751, the new year began again with March 25th. In Scotland, down to the close of 1559, it was reckoned from March 25th, but the year 1600 began with January 1st. It is said that Pope Pius the second, during his pontificate of six years (1458-1464), commenced the year sometimes on December 25th; sometimes on January 1st; and at other times on March 25th. The execution of Charles I, was reckoned to have taken place on January 30th, but while England made it the year 1648, Scotland made it 1649. This was owing to the fact that when he was beheaded, the new year began in England on March 25th, and by the Scots on January 1st. To obviate this confusion, and to concur with the practice which had been adopted by continental nations, an Act of Parliament 24 George 2nd, 1751, was passed regulating the commencement of the year, discontinuing the practice of beginning the legal year on March 25th, and adopting the 1st of January instead.

The Gregorian or reformed calendar, now known as the "New Style" was introduced the same year, whereas in most Roman Catholic countries it had been adopted in 1582, and in Protestant countries it was generally adopted to begin in the year 1700. England, then as now, showed her conservative spirit by postponing it till 1751. In countries under the Greek church the old style of the Julian Calendar is still in use. In England, as we have seen, the new year began in 1752, on January 1st, and continued to December 31st, but was reduced by 11 days in the month of September, by calling the day after the 2nd the 14th. We are told that when this took place, the work people paraded the streets demanding back the 11 lost days which had been taken from them.

LATE FORMATIONS AND GREAT CHANGES OF LEVEL IN JAMAICA.

By J. W. Spencer, M.A., Ph.D.

(Read February 5th, 1898).

CONTENTS.

Introduction.
General Topography.
Hydrography off the Coast.
Geological Basement of Jamaica.
Older Miocene History.—"The White Limestones."
The Mio-Pliocene History.—Epoch of Elevation; The Layton Formation; Comparison with the Matanzas and Lafayette Series and its Age.
Pleistocene History.—Epoch of Elevation; The Liguanea Formation; Comparison with the Zapata and Columbia Series.
Modern History.—Epoch of Elevation; Terraces; Coral Reefs; Beaches; Alluvium; a Review of Erosion Features since the Miocene Period; Faulted (?) Basins; Terrestrial Oscillations; Table of the Later Geological Succession in Jamaica.

INTRODUCTION.

This paper has for its object the special study of erosion features and the character of the later geological formations of Jamaica, and the characteristics of the adjacent seas which throw additional light upon the great changes of level of the region. The investigation refers only to the insular region, and is a sequel to the "Geological Evolution of Cuba," and "the Reconstruction of the Antillean Continent," wherein there has been collected evidence of the great changes of level of land and sea in recent geological times, producing mutations of the physical geography of a large portion of the American continent, the consequent changes in climate and the effects on the distribution of life. This paper is mostly descriptive, and strongly confirms the doctrines set forth in the earlier papers.

GENERAL TOPOGRAPHY.

Jamaica is 135 miles long with a maximum breadth of 50 miles, but with slightly submerged banks increasing its width to 60 miles (Map,

page 328). Physical maps show a mass of mountains intersected by narrow valleys. This is true in a general way, yet structurally or geomorphically, it is a plateau between 1,000 to 2,000 feet above the sea. Some deep valleys almost cross the island and are reduced to gentle gradients (Fig. 1, Plate I.), even before leaving the mountain masses. The margins of the table-lands are usually steep mountain slopes dissected by deep valleys. In the interior, the elevated valleys are often broad or form the savannas which appear to be the remains of former base levels of erosion, not yet reduced to the modern plane of denudation. The dissection of the margins of the higher land is progressing rapidly with the warm tropical rain which sometimes amounts to ten inches a day,* and the gradients of the streams are such that the widening of the valleys is no more rapid than the deepening of the ravines. On the table-lands, many of the ridges are only the remains of the former plains, but in the centre of the western two-thirds of the island there are mountains 3,000 feet high.

The eastern third of Jamaica is characterized by a mountain mass of much higher altitude than the plateaus of the western two-thirds of the island; and it culminates in Blue Mountain which rises to 7,335 feet above the sea. The rapid deepening of these valleys descending from this high mass may be considered as gigantic washouts a thousand feet deep; and these are sometimes situated so close together that their summit divides are scarcely more than knife edges (Fig. 2, Plate I.). Still it is remarkable to observe the human occupation and cultivation of sloping hillsides as steep as it is possible for the earth to hold to.

In front of the coastal range of mountains on the northern side of the island, which rise from 1,000 to 2,000 feet, the plains are almost wanting, excepting at the mouths of the valleys (see Fig. 1, Plate II., page 335). On the southern side of Jamaica, the coastal plains may have a breadth of four or eight miles in some embayments indenting the plateau region (see Fig. 4, page 337). These plains may rise from 100 to 600 feet before abutting against the mountain ridges.

In Jamaica there are the remains of three conspicuous old base planes of denudation which give rise to the features of the island as shown in Figure 1. In some cases the lower plains approach the structure of terraces, while those of the higher elevations are often only represented by successions of ridges or remnants of eroded surfaces of the same altitude. As the streams leave the highlands, they usually flow through

*At Port Antonio situated upon the northern side of the Blue Mountain mass, which locally condenses the moisture from the north-east trade winds, thirty-two inches of rain fell within three days, in December, 1894.

FIGURE 1.—The broader portions of Wagwater Valley almost reduced to the base level of Erosion.

FIGURE 2.—Upper part of Wagwater Valley, showing the mountains dissected by deep washouts. The broad floor of the valley has almost reached the base level.

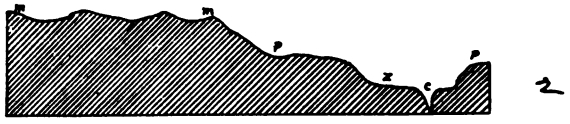


FIGURE 1.—Section illustrating a succession of base levels of erosion :—*m m*, an old plain now represented by only fragments of plains and ridges of similar elevation ; *p p*, a newer base level less defaced ; *s*, a later plain only incised by a *canyon* (*c*) of a stream cut since last elevation of the district.

canyons a mile or two in length which have been excavated since the last elevation of the island. The different phases of erosion will be further considered in connection with the characters bearing upon this physical investigation.

HYDROGRAPHY OFF THE COAST.

The northern side of the insular mass of Jamaica descends as abruptly beneath tide level as the mountains drop down to the sea. With a few exceptions the sea bottom increases to a depth of 600 feet within the distance of a mile from the shore, so that even the delta deposits cover small areas and have not filled the broader bays formed by the washings of the coastal regions when the land stood at higher altitudes than now. From the mouths of existing rivers (while some have changed their courses), channels though sometimes partly obstructed can be traced across the submerged shelf of the island, whether of coral reefs or of mechanical deposits. Even where the insular fringe is not covered with more than from 50 to 250 feet of water, the transverse trenches or *canyons* may be 600 or 700 feet deep. The descent of these submerged channels has a similar slope to that of the valleys which may reach to 500 or even 1,000 feet in a mile. The same narrow fringe extends around both the eastern and western ends of the island, but it becomes broadened to eight or ten miles upon the southern side of Jamaica.

A few examples of the deep channels crossing the insular fringe may be given :—Thus the submerged channel of Plantain Garden river has a depth of 612 feet at a mile from the shore, where the adjacent shelf is covered with only 156 feet of water ; so also at the mouths of the streams entering Hope, Buff, Falmouth, Montego, Lucea, Port Morant, and Morant bays, channels over 600 feet can be traced across the submerged fringe. Beyond that depth the successions of soundings have not been made by which the trenches can be followed to the deep sea of 12,000 feet and more to the north of the island.

Annatto is one of the widest bays along the northern coast, with a breadth of four miles between the outer headlands. Into this indenta-

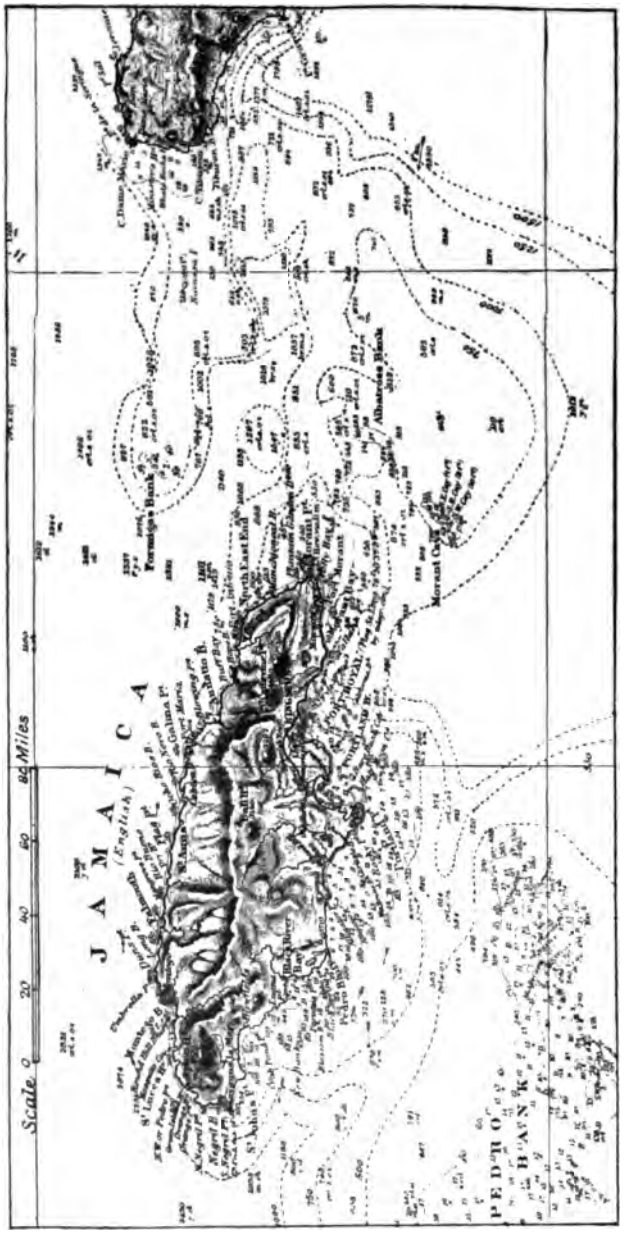


FIG. 2.—Map of Jamaica and adjacent sea, showing the adjacent submarine plateau dissected by deep Valleys. Sounding in fathoms of six feet. (From Hydrographic Office Chart).

tion the Wag Water, perhaps the largest river of the island, discharges, and during floods it carries great quantities of silt, yet the bay is not filled up, and at only a mile from its head, the channel is 624 feet deep. Dry Harbour is another kind of basin, only a mile across (and surrounded by an amphitheatre of hills), having a depth of 204 feet with the outlet now obstructed by a bar covered with less than 18 feet of water. These short, deep bays are like the valleys forming the amphitheatre indenting the margins of the table-lands of Mexico and other plateau regions (also illustrated in Fig. 2, Plate II., opposite page 335).

The broad shelf upon the southern side of Jamaica is only a continuation of the sloping coastal plains. It has a breadth reaching eight or ten miles from the shore, and it is covered with from a few to nearly a hundred feet of water. This submerged plateau appears to have extended from the end of the Blue Mountain chain, in St. Davids, across the Kingston embayment and thence to the mountains beyond Savanna la Mar. However, the two ends of the submarine shelf have almost disappeared, but there are outlying remains of it preserved in the banks or shoals. Thus the water, at less than a mile from the shore in the Kingston embayment, is over 600 feet deep, and at three miles 2,300 feet, but increasing so that at ten miles, opposite to the California bank, the depth of water is 4,662 feet (see Map, page 328, and Fig. 4, page 337). The Savanna la Mar embayment, at the western end of the shelf, had a depth of 1,974 feet near the shore, and 2,010 at the mouth opposite to the bank eight miles distant. Both of these embayments are submerged reproductions of the broader valleys, indenting the table-land of the southern side of the island, which are covered with the later alluvial deposits.

Across the shallow banks the channels of the rivers can be traced.

Unlike the Honduras sea, upon the northern side of Jamaica, which rapidly descends to abysmal depths, the Caribbean sea to the south deepens gradually for many leagues; consequently there are no drowned valleys near the insular mass deeper than 5,000 feet. Extending south-westward from Jamaica, there is a broad plateau reaching to the Pedro bank which is covered with from 3,000 to 4,000 feet of water. From the north-western side of this plateau there is a deep channel of 7,128 feet, or 2,400 feet below the platform, beyond which the Honduras sea reaches to abysmal depths (see Map, Fig. 2, page 328), of 15,000 feet. Pedro bank is again connected with the banks extending to the Honduras coast by a broad plateau now drowned beneath 3,000 feet of water.

A similar plateau connects Jamaica with Haiti. This is generally submerged to a depth of 5,000 feet. However, it is dissected with channels reaching down to 7,000 feet, and there are small basins probably connected, so as to form a channel extending to a depth of over 9,600, or more than 5,000 feet below the surface of the drowned plateau (see Map, page 328).

While the soundings are very numerous in many localities, they have not been made in directions for discovering the valley-like channels; nevertheless, many have been more or less revealed, but for the fuller exposition, the soundings should often be taken along other lines and closer together. In off-coast soundings, while the depths are accurately determinable, there may be errors of locations on the charts of two or four miles which may give rise to the impression of the occurrence of deep holes, where there is no reason for other depressions than portions of channels. However there are very few of these small basins suggested within the Antillean plateau.

GEOLOGICAL BASEMENT OF JAMAICA.

The stratigraphy and older geology of Jamaica have been partially described by the former geologists of the island,* so that only a few of the characteristics which have produced effects upon the later geomorphy need be considered.

The nucleus of the island, as may be seen in the higher mountains, consists of some metamorphic shales and igneous rocks of a syenitic, dioritic, and porphyritic nature which are usually decayed and covered with very deep soil. Round these accumulations, compact Cretaceous limestones succeeded by Cretaceous sands and marls occur in narrow belts. The igneous rocks are however younger than the Cretaceous series, for dykes of them cut into this formation. The easy atmospheric degradation of these rocks covered with loose soil suggests the comparatively recent great elevation of the higher mountains, thus favouring the uncovering of the older formations. These formations are next succeeded by a great thickness of what the Jamaican geologists called "Lower Tertiary or Conglomerate Series," consisting of sandstones, grits, shales and massive conglomerates. Whether this series be entirely Tertiary, or partly older, is immaterial in this study, for we shall not attempt to reconstruct the geography of that date, or to determine the sources whence the fragments of the crystalline rocks and mechanical deposits of the island came.

*Geology of Jamaica, pp. 1-339, 1869. By James Sawkins, J. P. Wall, Lucas Barrett, Arthur Lennox, C. B. Brown, and Robert Etheridge.

The succeeding "Yellow Limestone Formation" consists of yellow sands, and marls with layers of limestone. In the middle part of the series, the marls are replaced by Orbitoidal limestones. This formation has been classed as of Miocene age, but the presence of Orbitoides correlates it with the Eocene of the northern continent. Moreover, at the base of the overlying "White Limestone," fossils have been collected belonging to the Eocene period. Above the Orbitoides bed, the marls contain numerous foraminifera, as seen at Folly's Point just east of Port Antonio, and may indicate a deep water origin.

Remnants of marls rich in Pteropod remains were found at two or three localities upon the north-eastern coast of Jamaica up to an altitude of 300 feet. The Pteropod marls indicate moderately deep water origin. They are among the highly disturbed strata, apparently at or near the base of the "White Limestone." They are unimportant in the study of the recent topography.

All the formations thus far referred to are greatly disturbed, and there are several unconformities. The various deposits usually occur in isolated tracts cropping out from beneath the overlying "White Limestones" on account of the enormous denudation of the latter series which even now covers five-eighths of the island.

OLDER MIOCENE HISTORY—"THE WHITE LIMESTONES."

This widespread series is white or light-coloured, impure Tertiary limestone, with some arenaceous and marly beds. The structure varies from thick massive beds to thin layers, sometimes soft and marly, again a fine-grained rock with an earthy appearance, in which some strata are brecciated or flinty. Where not washed off by the tropical rains the residual soil is a red earth similar to the residual products of Tertiary limestones of Cuba, and other West Indian lands. Some of the beds are very much honeycombed and caverns abound in them. This structure becomes so exaggerated on the highlands of the northwestern part of the island, that a large area is rendered uninhabitable, owing to the numerous sinks called "cockpits," two or three hundred feet or more in diameter and deeper than they are wide. The remains of this formation reach a thickness of more than 2,000 feet according to the Jamaican geologists, and occur at altitudes up to 3,000 feet. It is this series which forms the starting point of the present researches.

These limestones cover the larger portion of the western two-thirds of the island, and form the coastal range of mountains which rises abruptly from 1,000 to 2,000 feet above the sea. Indeed, it is probable

that this series once covered even a much larger area than at present. In spite of the great thickness of the limestones, simple or complex valleys from one to five miles wide have been cut through them; and the seaward margins of the highlands have suffered so much denudation that the lower beds of the formation have been exposed even where they dip outward from the plateau. The solvent action of the tropical rains produces a much more rapid degradation of the rocks than occurs in the temperate latitudes. The exaggerated amount of erosion of these limestones is referred to in order to point out the improbability of ever finding the higher beds of the series, though some must have been deposited, and thus the stratigraphical gap in the geological succession is greater than the interval of time which the break represents. Accordingly, as there is only the older portion of the series preserved, it is necessary to look for a somewhat later date in order to determine the period when the land was first raised high enough to suffer denudation. This elevation was the last uplift accompanied by any considerable disturbance of the horizontality of the strata. Indeed, the "White Limestones" have their beds highly tilted and often occur in sharp folds, with occasional faults. This structure is shown in many canyons of the streams crossing the formation. These physical disturbances occurred immediately before the Mio-Pliocene period of denudation.

However characteristic the name, it is confusing, for the term "White Limestones" has been given to different formations on various islands and the continent. The Jamaican geologists were contradictory as to the age of the "White Limestones." However, these strata represent a physical and almost a lithological unit. They have close analogies in Cuba, Santo Domingo and elsewhere, and they are the last great development of limestones in the West Indies, although unconformably succeeded by other accumulations. It is from the physical standpoint that the formation is most important in this study. From the appearance of the contained fossils, the series is doubtless complex, and probably separable into Eocene and lower Miocene or (Oligocene) formations. While in places the Eocene beds may not have been deposited at the base of the great mass of rocks, in other localities the overlying beds have been so removed as to expose the lower formation, but the older Miocene (or Oligocene) beds seem to prevail.

In this geomorphic study, the important feature is that the great denudation of the island was subsequent to the disposition of these older Miocene limestones.

It was the prevailing impression among the Jamaican geologists that

the "White Limestone Formation" was Miocene. In the few cases, where they gave lists of fossils in the local descriptions, their catalogues have been considered by Dr. W. H. Dall to represent the lower Miocene epoch, or what he now calls American equivalent of the Oligocene beds, which occur in Florida and the Southern States. So also in the list of fossils by Mr. Etheridge, he identifies the same formation, but unfortunately the localities were not given. Again, Mr. Charles T. Simpson collected at Bowden, near Port Morant, in the marly beds (probably in the lower part of the series at that locality), about 500 species which Dr. Dall has only partly studied, yet, sufficiently to pronounce them as belonging to what has been usually called Lower Miocene or Oligocene. At that locality the fossiliferous marl bed is only about a foot and a-half thick.

East of the Turtle Crawl Harbour, a few miles from Port Antonio, Mr. Eugene Baker collected a quantity of fossils, and of the same species the writer collected more specimens near the base of the great limestone series. The fossils are entirely in casts, but of these Dr. Dall has determined the following genera, and pronounces them as apparently of Eocene age :—

Xenophora.	Velates.
Turritella.	Conus.
Strombus.	Natica.
Ampullina.	Spondylus.
Turbinella.	Terebellum, two species.

Both the Eocene and (old) Miocene fossils occur in the succession of limestones forming a physical unit. The older Miocene is extensively developed in Santo Domingo as shown by Dr. W. M. Gabb.* In the Windward group, where the rocks have been particularly exposed to erosion, Mr. P. T. Cleve† found fossiliferous Eocene beds at the surface.

From personal studies in Jamaica, Cuba and the Southern States, and from all the information obtainable from other sources, the writer is led to the conclusion that the great denudation of the West Indies and the adjacent regions commenced rather late in the Miocene period and did not culminate until in the Pliocene period, for over a very wide region the same long continued erosion leaves only the older Miocene without any remnants of newer Miocene or older Pliocene or even Mid-Pliocene beds. This same absence of Mio-

*"On the Topography and Geology of Santo Domingo," by William M. Gabb, Trans. Am. Phil. Soc. vol. xv., pp. 49-259, 1872.

†"Outline of the Geology of North-Western India Islands," by P. T. Cleve; Annals, N.Y., Acad. Sc. vol. ii., pp. 185-194, 1882.

Pliocene formations appears to prevail generally in Cuba, in the South Eastern States, and in the Windward Islands, while beds of that period occur on the Tehuantepec Isthmus in Mexico. The degradation was of long duration for the streams reduced their valleys to base levels of erosion far inland on the continent, and their courses were marked by broad valleys. On some of the lands which now form islands, the same is true, for where not entirely removed the limestones often remain only in fragmentary outcrops.

The preservation of the older base levels of erosion, imprinted upon the limestones, shows that the tablelands were not relatively as high as at present, but the question of the late unequal terrestrial movements becomes important in determining the Pliocene area of what are now the islands.

That the time of the elevation commenced somewhat earlier in one locality than in another distantly located, and also ended in the same manner, is probable. Where we find overlying accumulations resting on the limestones, there we can judge of the relative duration and character of the first period of denudation succeeding the early Miocene deposits; but at higher altitudes in Jamaica the period of degradation has continued since the first elevation after the formation of the limestones, consequently the erosion features represent the combined characteristics of successive epochs of denudation.

THE MIO-PLIOCENE HISTORY.

Epoch of Elevation.—The Mio-Pliocene period in Jamaica was characterized by the elevation and dislocation of the "White Limestones" and the subsequent long period of atmospheric degradation of the existing land surfaces followed by a comparatively short one of the formation of new beds of marine accumulations.

The denudation of the old Miocene land surfaces which covered five-eighths of the island, represents the erosion in progress, more or less continuously, since the first elevation of the Miocene strata, whether before or after the middle of the Miocene period. Dr. W. H. Dall informs the writer that he has seen no collection of Miocene fossils from the West Indies which represent beds newer than the lower part of the series (or the Oligocene). In making correlations between the physical features and the fossiliferous strata, whose time divisions are based upon the percentage of living forms only (and without such a break as that on the northern continent, where the older Miocene beds are characterized by a tropical fauna, while the later assemblage of

FIGURE 1.—Mountains south-east of Port Antonio, showing deep valleys dissecting them.

FIGURE 2.—Lucea Bay, a drowned amphitheatre indenting the margin of mountain plateau.

fossils, only occurring further north, belong to temperate waters), the exact epoch of change is not determinable. However, the succession of physical breaks can be established beyond doubt, without impairing the value of the determinations, even if the terrestrial movements commenced a little earlier in one locality than in some other. In the physical history of the West Indies, a wonderful degree of uniformity, over vast regions, characterizes the later geological periods.

As the upper Miocene fauna of the northern continent belonged to temperate, in place of tropical forms of the earlier epoch, some great physical cause must have produced the change, and thus we may suggest that the elevation of the West Indies occurred before the later Miocene period; consequently the great erosion of Jamaica seems to date to an epoch before the Pliocene period. The physical changes in the island were accompanied by great dynamical disturbances, which not only elevated the land but also folded, distorted and fractured the heavy bedded "White Limestones." While these derangements of Miocene strata also occurred in Cuba and San Domingo, the corresponding beds in Florida and Georgia are not dislocated or upturned.

Late Pliocene (?) beds rest upon the Miocene surfaces, which are now often eroded below sea level. At that time the relative elevation of the interior of the island, compared with the coastal regions, appears to have been much less than at present. As there are marine accumulations, referable to the late Pliocene epoch, preserved, it becomes possible to form some idea of the different characteristics of erosion during the Mio-Pliocene elevation, and the degradation, subsequent to the accumulation of the Layton beds, which are provisionally referred to the end of the Pliocene period.

In the highlands, the general denudation has reduced the old Miocene surfaces so that the limestones form ridges or mountains, and elevated base planes of erosion, largely completed during the Pliocene elevation (as shown at m m Figure 1, page 327). The degradation of the island since the late Pliocene (?) deposits is characterized by the formation of deep valleys, often broad (Fig. 1, Plate II, opposite), and dissecting the older base levels of erosion. The broad embayment-like valleys, several miles wide (see Figure 3, page 336), among the mountains upon the southern side of the island, are largely features of the Pliocene denudation, more or less modified in later times. Of the same character are the fewer coastal indentations on the northern side of the island such as at Annatto Bay, Montego Bay, and Lucea Bay

(see Fig. 2, Plate II.). The character of the embayments referred to, is that of valleys surrounded by highlands, and which rapidly increase from less than a mile to five or ten in width, where several streams have their valleys united before leaving the plateau district.

These reëntrant valleys have been largely broadened by the rains and small streams entering the rivers, which mostly act as carriers of the *debris* off the land, for they have almost reached their base levels of erosion, the floors of which are gently undulating plains The location of these embayments is independent of the orographic structure of the district, at times occupying the hollows in the mountain folds, and again crossing them at all angles. Fragments of gradation plains terminating abruptly at high elevations, suggest that the plateau mass of the interior has been elevated since the excavation of the valleys at lower base levels. The valleys indenting the mountain mass

FIGURE 3.—Plan of a low base-level valley indenting the margins of the highlands of Clarendon Parish,

which is illustrated in Figure 3, bear a close resemblance to the submarine embayments, with the same character of floors as shown off Kingston and Savanna la Mar, where the sea is now from two thousand to over four thousand feet deep, with the submerged plateaus extending to Haiti on the east, and to Honduras on the west, having much the same depth, although traversed by deeper channels, but with the higher portions of the drowned plateaus having the appearance of old

base levels of erosion (see Map, page 328 and Figure 4). The deeper channels belong to a later date. This resemblance suggests that the submarine plateau with embayments reaching into the insular mass of Jamaica, such as that south of Kingston, was a land surface during the Mio-Pliocene elevation. The abrupt descent of the northern side of the island suggests great dislocations off that part of Jamaica, and that the forces which squeezed up the island, also rammed down the sea floor to the north. However, it must be emphasized that all the disturbing forces whether acting on what are now land surfaces or those submerged have not generally obliterated the ancient

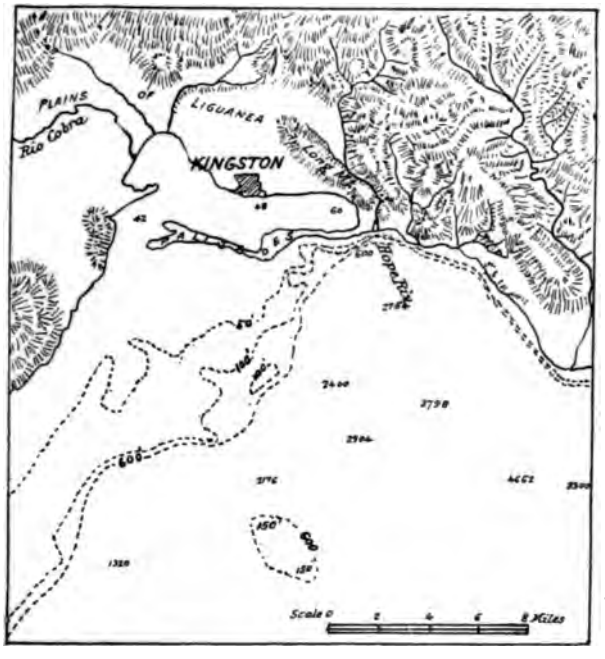


FIGURE 4.—Map showing the character of the embayments off Kingston Harbor; and the coastal plains back of the city.

drainage. It may be noticed that the writer assumes that typical valleys with open drainage are the result of atmospheric denudation. This problem has been discussed in both the "Reconstruction of the Antillean Continent," and in the "Geographical Evolution of Cuba."* It will be again referred to in succeeding pages after describing the local characteristics of the different geological periods, as the physical features of Jamaica have their counterparts on the other islands.

*By J. W. Spencer, Bull. Geol. Soc., Am., vol. vii., pp. 103-140, 1894; and Ib. vol. vii., pp. 67-94, 1895.

The Layton Formation.—After the long Mio-Pliocene elevation, Jamaica sank to about 500 feet below sea level, accordingly up to that elevation, a newer series of beds is now found. These rest unconformably upon the eroded surfaces of the "White Limestones;" but as they form only fringes about the high plateaus, and have been very greatly denuded, they occur only in isolated fragments where protected in some embayment of older date. A well-preserved fragment may be taken as an example of the formation.

Between Hope Bay and Great Spanish River there are the remains of the Low Layton volcano (see Map, Figure 6, page 345), which is called the Black Hill, rising to an altitude of 700 feet, which dates back to the Pliocene period, but considerably anterior to the formation of the marls which lie upon its denuded surface. This hill has protected the marls more or less against the marine erosion upon the sides of the sea. Just after crossing Swift River, which enters Hope Bay, some dislocated beds of shale are seen along the roadside, appearing from beneath the base of the "White Limestones," whose beds are always more or less distorted. On the eroded surfaces of the limestone there occurs a heavy deposit of marls, in colour from white to yellowish, or nearer the old volcano of gray tint, on account of the inclusion of volcanic ashes. The western end of the volcano is shown in Fig. 1, Plate III. The beds are laminated and are not seen to undulate with a dip of more than seven degrees, but as a whole, the formation may be considered as horizontal. The laminations are distinct in places, while in others they are represented by lines of pebbles or rounded gravel commonly not more than three inches long, but the pebbles may be double that length. These are composed of white limestones which form the adjacent coast range, or nearer the volcano, some of the pebbles are water-worn volcanic bombs or other fragments. Scattered through the marls, there are blocks of white limestones, sometimes having a size of from ten to twenty cubic feet, in part derived from the adjacent mountain, and in part from the volcano. These large blocks are dependent upon local conditions, but it is of primary importance to note that the marl is largely a mechanical accumulation, derived from the degradation of the white limestones. The formation rises to an elevation of about 475 feet above the adjacent Honduras sea, but its maximum thickness cannot be specified as it rests unconformably on the "White Limestones," and its own surface was subsequently greatly denuded; and afterwards succeeded by a minor formation.

This locality may be considered as a typical remnant of the forma-

FIGURE 1.—The western end of "Black Hill,"—the remains of the volcano of Low Layton, now unconformably covered by the Layton Series and the Liguanea Series.

FIGURE 2.—Mountain back of Port Antonio, which town is situated on an elevated base level, forming a terrace.

tion (except the inclusion of volcanic rocks), as the underlying unconformability is apparent, and also the occurrence of another uncomformable series overlying its eroded surface.

A few poorly preserved fossils have been found in the marls apparently belonging to modern species of *Cardium* and *Ostrea*. In the volcanic beds some remains of fossil trees occur along the coast.

At Port Antonio, on the terrace where the town is built, the upturned strata of White Limestone are succeeded by a bed of yellowish-white marl, from two to five feet in thickness, containing rounded pebbles which occur in the Layton series. (Figure 2, Plate III).

Two or three miles west of the old Low Layton volcano, Great Spanish River enters the sea after having excavated a valley more than a mile wide in the coast range of mountains. Here the greatly eroded hillocks of gravel and loam rise from 40 to 100 feet above the sea. The gravel often occurs only as layers scattered through the loam. The beds may undulate and dip at as much as five degrees, or the undulations are similar to those in the Layton marls. They lie upon the older eroded surface as do the marls, but in places even the White Limestone was entirely removed before their deposition. These gravel beds have apparently the same age as the marls, being equivalent to the calcareous accumulations, at localities where the streams have brought down the mechanical *debris*. The same phenomenon of the replacement of the mechanical marls by gravel where the materials are derived from the valleys, is a frequently recurring feature.

Two sources of difficulties arise in identifying the Layton formation; (*a*), when the unconformity between the White Limestones and the marl is not observable, the one formation may be mistaken for the other, but this is in part corrected by the common inclusion of rounded pebbles in the Layton marls whether of limestone or some silicious rock, a character that does not commonly belong to the White Limestones; (*b*), when the unconformity between the Layton loams and gravels with the overlying mechanical deposits of the same character is not shown, there is a liability to error, but this is often corrected by the appearance of the greatly eroded surfaces, or even only fragmentary remains of the Layton gravels, for the denudation since the deposition of the newer gravels, to be noticed hereafter, has been comparatively slight. This later degradation of the land forms an important feature to be noticed again.

Some half a dozen miles east of Kingston, the Hope River *canyon*

enters a broad valley excavated out of the mountain mass of the White Limestones. At various altitudes up to 150 feet above the sea, there are horizontal beds of water-worn gravels, resting upon the surfaces of the White Limestone. The pebbles are more or less composed of the White Limestones, and in size usually less than four inches long. While these gravels occur up to an elevation of 50 feet or more above the floor of the valley, they are only fragmentary remains of a deposit which probably filled the valley. Above the gravels there are some marls, which appear to be higher beds of the same series, as it is characteristic of this formation and its equivalents in Cuba that the lower beds are apt to contain the greater quantity of pebbles, and the same is true of the equivalent loam and gravel series.

On the road between the mouth of the Hope River and Kingston, at the end of Long Mountain, where it almost projects into the Caribbean Sea, there is a conglomerate loosely held together, composed of mostly subangular gravel of White Limestone derived from the adjacent mountain. The bed dips at 10 degrees towards the sea, and rises to an elevation of 150 feet, overlying the surface of which there is an unconformable bed of sand and gravel. This conglomerate is a fine exposure of the mechanical character of the Layton formation, which is also here succeeded by a newer formation. It further indicates the more recent elevation of the mountains. Between the mouth of the Hope River and this point, along the roadside, there are several exposures of gravel and loam of which the pebbles are sometimes one or two feet long, covered by blocks of the White Limestone, occasionally four feet long, which are cemented into a bed four or six feet thick. All of these gravels and loams are quite unlike the upper deposits which will form a distinct topic. Some of the older alluvium described by the Jamaican geologists belong to this horizon; but the relationship of the latter divisions of the geological scale were not considered by them.

Crossing the island again, to Montego Bay and going westward to Lucea Bay, the post-Miocene formations may again be seen near the coast. At Hopewell, a few miles west of Montego Bay, occupying an embayment in the White Limestones there is a marl containing modern fossils, upon whose eroded surface rest some gravel deposits, which are surmounted by the modern limestone of the region. The lower marls are thought to have the same position as the Layton series farther east. At twenty and a-half miles west of Montego Bay, apparently the same beds recur, but as there are no overlying deposits resting upon them, there is always the danger of mistaking them for the more modern limestones of the coast, as the fossils have no determinative

A Promontory of Pleistocene Limestones dissected by a large valley now refilled and forming plains in foreground of the illustration.
Near Hopewell west of Montego Bay.

value. At this locality the following modern species were found by the writer, and kindly determined by Mr. Charles T. Simpson :—

Cardium serratum (L.)	Arca Sp.
" laevigatum (L.)	Tellina fausta (Don.)
" muricatum (L.)	Zoripes edentula (L.)
" sp.	Levona pica (Gm.)
Lutricola interstriata (Say.)	Strombus gigas.

Corals were not determined.

Near Orange Cove, west of Lucea Bay, resting on an eroded ridge of White Limestone, only 300 feet wide, there is a deposit of gravel with small boulders of ten inches diameter, with marl above, the same as at Hopewell.

On Mrs. Roger's hill at Lucea Bay, at an elevation of 80 feet above the sea, resting on the eroded shales, for all of the White Limestones had here been removed, there is a deposit of from four to eight feet of marl resembling the Layton series of the region, in being subsequently greatly eroded and in containing small water-worn pebbles, but as no overlying formation was seen it cannot positively be asserted to be the equivalent although resting on the denuded old foundation. From it the following fossils were obtained, and Mr. Simpson also kindly determined them :—

Strombus pugilis (L.)	Turbo castineus.
Pecten nucleus (?), (B.)	Pleurodonta jamaicensis.
Arca noae.	Cardium lævigatum (L.).
Lucinea jamaicensis.	Venus cancellata (L.)
Arca (like) lienosa (perhaps extinct).	Pleurodonta lucrina (Mued), var.
" jamaicensis (Gm.)	towards acuta.

From the paleontological standpoint, all of the fossils from the series, such as are probably the equivalent of the Layton beds, belong to modern species, but the enormous amount of denudation and other changes which have occurred since their deposition place the formation a considerable length of time ago.

Of the Jamaican geologists, Mr. C. B. Brown* seemed to most clearly appreciate the importance of the later deposits. He describes extensive beds of marl, of a mechanical origin, derived from the White Limestones, as covering considerable areas in south-east Jamaica and in many places he notes the scarcity of fossils, the shells, though [illegible] better preserved, and belong to modern species. These shells are preserved in the embayments [illegible] Limestone," and are noted as [illegible]

* Geology of Jamaica. [illegible]

marl has been used for some of the beds of White Limestones, as well as for the newer formations, so that it would require further investigations to know how much of his marl formation is referable to the Layton series, and how much to the "White Limestones." Perhaps a portion of it may be even more recent.

The Layton series occurs as a veneer up to elevations of 500 feet. While often not more than ten or twenty feet thick, it may reach 200 feet in depth when occupying older valleys which it has partly filled.

The Layton series is the first formation occurring in Jamaica subsequent to the "White Limestone," (Older Miocene). The fossils are few in number and it is not certain that there are any extinct species among, to say the least, predominating modern varieties. The mechanical character, even where the deposits are mostly composed of marls, may in part account for the common absence of fossils. The denudation following the Layton epoch has in a great measure carried away the formation. Upon the resulting weather-worn country, another mantle also largely mechanical, was laid down. The surface of this latter accumulation has suffered a less degree of erosion than the Layton series, but sufficient to frequently expose the remains of that deposit.

Comparison of the Layton Series with the Matanzas of Cuba, and the Lafayette of North America, and its Age. — In Cuba the same mechanical marls or limestones occur, containing water-worn pebbles, and resting upon similar white limestones of old Miocene or Oligocene age, whose surfaces had been greatly eroded. These mechanical marls in Cuba have been designated the Matanzas series* by the writer. The fossils are usually scarce, but they are modern species and quite unlike the Miocene fauna. On the continent the old Miocene accumulations are very much eroded, so that they are often removed from the valleys, and succeeding them (except in Southern Florida), there are the Lafayette red loams and gravels, the latter, where present, usually forming the lower part of the series. The thickness of the whole series, except in the valleys, does not usually exceed twenty feet. This formation so extensively surveyed by Prof. W. J. McGee† occurs over a broad belt of the Atlantic and Gulf states, and the writer has seen it even as far as the southern side of the Gulf of Mexico. In place of being derived from the White Limestones of Jamaica and Cuba (of Tertiary age), the materials of the American Lafayette formation have been derived entirely from the residuum of the decay of rocks of

* "Geographical Evolution of Cuba," by J. W. Spencer, Bull. Geol. Soc. Am., vol. vii., pp. 67-94, 1895.
† "The Lafayette Formation," by W. J. McGee, 12th Rept. U.S. Geol. Surv., pp. 347-522, 1892.

various age from the Tertiary, in very small part, to the Archæan, and also from other rocks as well as from limestones. Although the sources of the materials were so varied, yet the formation presents a remarkable degree of uniformity, such as indeed arises from the decay of most rocks.

Owing to like successions in the geological scale, with the same breaks above and below, the writer desires to strongly emphasize the apparent equivalency in separated regions, between the Layton of Jamaica, the Matanzas of Cuba, and the Lafayette of the Southern States, with corresponding series in Santo Domingo and the Windward Islands. The varied succession of events which has occurred since the Layton epoch, places it a long way back in actual time; and the physical successions and interruptions continued alike in Jamaica, Cuba, and the Southern States.

On the continent, there are indications that some of the marine beds of Florida and the Lafayette loams and gravels are of the same age, but derived from different sources. Prof. W. J. McGee, the great exponent of the Lafayette formations, and Dr. W. H. Dall, as well as the writer, all provisionally classify the Lafayette as belonging to the close of the Pliocene period, especially as the formation is older than the glacial deposits, where first they occur in contact in New Jersey. From this consideration the Layton epoch has been placed at the close of the Pliocene period. The sequence of events will be better understood as we proceed. But, if others prefer to regard the Layton series, on account of its recent fauna, as belonging to the Pleistocene period, it is physically immaterial and only suggests a greater duration of Pleistocene time; and they can transfer the author's references from the late Pliocene to an early Pleistocene epoch. The submergence of the Lafayette, Matanzas, and Layton epochs may have commenced a little earlier in one locality than another, and also ended later, but the formation seems to constitute a geological unit.

The absence of the Mio-Pliocene formations from Jamaica, and indeed from the West Indies, followed by the Layton series, is manifestly due to those general elevations preventing their accumulation, for older Pliocene deposits occur on the Tehuantepec Isthmus of Mexico, which should have theoretically been depressed at the time of the West Indian elevation; and such has been found to have obtained.

PLEISTOCENE HISTORY.

Epoch of Elevation.—After the Layton epoch of submergence, there was a long period of high elevation, during which most of the Layton series, forming fringes along the steep mountain sides close upon the coast, was removed by denudation. Thus the formation does not occur continuously round the island, and is only preserved in protected districts or in some indentations entering the highlands. In the typical locality, about Low Layton, the Layton series is greatly denuded, and upon the eroded surfaces the Liguanea formation is deposited. In many places the series appears to be covered by the succeeding loams and gravels, without being exposed by later erosion.

Apart from the degradation of the Layton formation, there was a marked change in the character between the post-Layton and the earlier epochs of erosion. This difference is represented by the deep and more or less widened valleys, which dissected the old base planes of erosion among the plateaus of White Limestones, and thus gave rise to much of the ruggedness of the island. This feature is illustrated in Figure 5. The higher margins represent portions of an elevated plateau, which has been denuded so as to form numerous prominences of similar height, separated by broad, undulating troughs and valleys, indicating lower base levels than at present. The rocks are composed of the Old Miocene "White Limestones." They have been subjected to denudation since their first elevation. Lower down the plateau, there are two

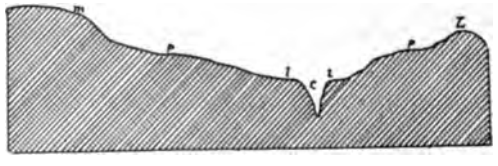


FIGURE 5.—Section across the Hope valley (east of Kingston), about three miles long, as viewed from the north:—*m L* (Long mountain, (*L*) 1528 feet above tide), old "White Limestone" topography; *p p*, remains of early Pleistocene base-level outlines; *l l*, base-level terrace formed during Liguanea epoch; *c*, *canyon* of recent date being cut below the Liguanea level (which is 550 feet above the sea).

distinct base levels of more recent erosion, besides the modern gorge. The stream is still deepening its channel, owing to the recent elevation of the land. (See Plate vi., page 350).

The feature of primary and secondary valleys and *canyons* is well represented in the coast range plateau from Port Antonio to Annatto

Bay, which may be partly illustrated in Map, Figure 6. At the ends of the district shown on the Map, the White Limestones have been

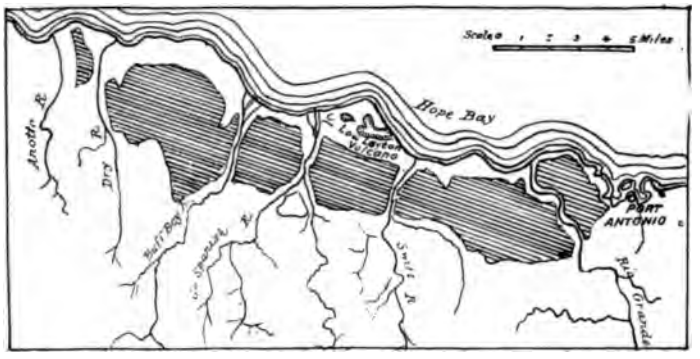


FIGURE 6.—Map from Port Antonio westward; showing the erosion of gorges through the mountain plateau, ("White Limestone," shaded portion), 700-1,000 feet above tide.

removed for distances of three or four miles, with the formation of compound valleys in the older strata. Along the rivers, shown on the Map, (Figure 6), there are the remains of upper broad valleys deepened into narrow *canyons* along the streams, the relative sections of which are shown in Figure 7.

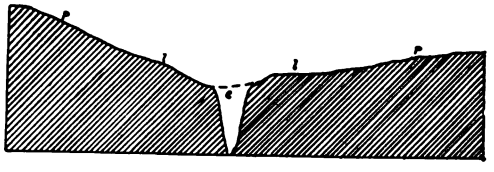


FIGURE 7.—Section of natural proportions taken from a photograph of the outlet of Swift River (near Hope Bay). Higher part of mountain about 1,000 feet; *canyon (c)* (concealed by its windings from the exterior view), whose bed is only from 50 to 150 feet wide; *p p*, the section of the valley formed during its post-Layton or early Pleistocene base level; and *l l*, that formed during the Liguanea base-level.

The secondary valleys are not broad undulating plains and ridges, such as characterized the Mio-Pliocene erosion, but such as result from the widening of old gorges by rains and streams as shown in Figure 7. Behind the coastal highlands of White Limestones (as in Figure 6), there are large valleys bearing a relationship to the depressions across the rocky highlands (such as l. l. in Figure 7). These are surrounded by amphitheatres of hills, all showing gradients which in part reach to several hundred feet per mile—in short, like gigantic washouts. While the *canyons* record the amount of recent elevation, yet the valleys above them indicate that the higher work of the streams dated back to the great post-Layton or Pleistocene elevation.

Tu[illegible]w to the submarine plateaus adjacent to Jamaica (Map, ge 3[illegible], the soundings indicate the general character to be that of a ubmerged table-land now 3,000 or 4,000 feet beneath the surface of the sea. Across this submarine plateau, there are several deep trenches like those of the Jamaican highlands but of greater magnitude, for obvious reasons. Thus a few miles southwest of Jamaica, where the edge of the shelf is covered by 4,800 feet of water, there is a drowned channel 2,400 feet deeper. South-east of the island, before reaching orant Bay, another narrow valley is depressed to 5,000 feet, or 2,000 eet below the adjacent level of the plateau. The Kingston embayment already shown in Figure 4, is another example. On approaching Haiti, a characteristic embayment of great depth, surrounded by steeply sloping sides, reaches to a depth of 4,000 feet below the floor of the plateau, or 11,000 feet below the surface of the sea. Upon the northern side of this same plateau, for a distance of over a hundred miles, the drowned valley is conspicuous, having a breadth increasing to twenty miles, and a depth of nearly 7,000 feet, with depressions suggesting that it may generally reach to nearly 10,000 feet, while the northern ridge is submerged only 4,000 feet. The head of this drowned valley approaches the embayment near Haiti, and the trench connecting them is considerably deeper than the general surface of the submarine table-land. These deep channels dissecting the drowned plateaus have very much the same ratio of their parts, but from two to four times as great as the deep valleys of Jamaica, and they also receive tributaries from various directions. The topographic forms suggest a similar origin for the plateaus in the same general Mio-Pliocene period, (whether above or below the surface of the sea), with the subsequent post-Layton, that is to say, early Pleistocene, elevation of great proportion.

A comparison of the erosion features before and after the Layton epoch may admit of further explanation. The earlier erosion was characterized by broad undulations (the period of the formation of the plateau surface), proving the general degradation of the country, lasting for a long period at base level of erosion, thus requiring a lower altitude for the plateau on its great extension seawards. Probably both conditions obtained, for a portion of the elevation of the interior district appears due to a comparatively recent squeezing upward of the plateau and mountain mass, as has been definitely observed in other islands. Whether the terrestrial and submarine plateaus represent entirely different steps of the Mio-Pliocene erosion features, or in part were once a continuous base level, subsequently dislocated and modified, can hardly be determined at present. Similar features are more perfectly

seen in Mexico, where the table-lands more than 6,000 feet above the coastal plains demonstrate their own recent elevation, and yet, had the lower coastal plains rising now to 1,700 feet above the sea, been formed, with the high escapement behind them exposed to denudation so far above the base level of erosion, the plateaus would have been dissected by valleys penetrating the highland mass infinitely farther than those of the present border. Thus it is suggested that the plateau region may have received upward thrusts, bringing side by side features of old worn down topography, and others of the most recent date. Accordingly similar features in Jamaica, but with the plateaus more degraded than in Mexico, suggest that the land and submerged plateaus of Mio-Pliocene age were moulded when the base levels of the two regions were more closely related than at present.

The great deep channels, whether above or below the sea, *canyons* or valleys, and fjords, alike dissect the plateaus of which those beneath the sea have the greater magnitude with consequently greater incisions. These features represent a period or epoch subsequent to base leveling of the plateau surfaces. These deep valleys upon the land and upon the border of the sea, are of post-Layton Age, as the deposits of that epoch have been penetrated by the subsequent erosion. This feature suggests their origin generally at the more recent date, rather than of pre-Layton Age with the valleys partly refilled and again reopened. This last view in part might be considered, but it would necessitate two epochs of enormous elevations, yet of much shorter duration than the period of Mio-Pliocene base leveling; one before and one since the Layton epoch of submergence. Moreover, the epoch of greatest elevation on the continent is post-Lafayette, with the consequent enormous amount of excavations of the valleys. Consequently the writer is not inclined to regard the developments of the very deep valleys as reopened pre-Layton channels, as he was disposed to do at an early period in his West Indian studies.

The Liguanea Formation.—After the epoch of Pleistocene elevation just described, Jamaica sank so that the coastal region was depressed to 600 feet more or less, and loams and gravels were deposited upon the floors of the drowned lands. To these accumulations the name of Liguanea, being that of the coastal plain from Kingston for twenty-five miles westward, has been given. This formation is essentially a mantle of 20 feet in thickness, or more in the buried valleys, which is unconformably deposited in places upon the Layton ruins, and where these are removed, as is often the case, upon older formations. The Liguanea

formation embraces much of what the Jamaican geologists call the alluvium without further designation. Its principal development is on the southern side of the island, as the mountains come close to the sea upon the northern side, but even there it occurs at many places. It has been seen at all altitudes below 600 feet, but it may not in every district reach so high. The stratification of the loam is often indistinct, or it may be characterized by lines of pebbles, especially in the lower portion of the series. Yet, in the sections exposed by some of the streams, the stratification is shown, and in the delta where the Hope River leaves the mountains, it is over 100 feet thick, with a large amount of the material composed of stratified gravel, often coarse, with even large boulders from the mountain valley deposited along the bed of the streams. The pebbles are all water-worn, and where not wanting, constitute the lower part of the formation. They are in places composed of both White Limestones and older rocks brought down by the streams.

The loams vary from grayish to reddish, according to the sources of the materials. The redder loams are apt to contain great quantities of pellets of oxides of iron. The loams are derived from the residual soils, accumulated upon the decay of the White Limestones being washed down to the sea. Such materials may also be commingled with disintegrated shaly or sandy rocks brought from the interior by the streams. Back of Kingston, (see Figure 1, Plate V.), the formation forms a mantle occurring up to an elevation of 550 feet on the Mono estate, and somewhat higher nearer the delta where the Hope River leaves the mountains. At this locality the river has cut through and exposed nearly 150 feet of loams, gravels and boulders. The location may be seen in Map, (Figure 4, page 337). The Liguanea plains slope a hundred feet in the mile, but outside the gorge of the Hope, the surface is seldom deeply channeled by the running waters. The surface appears to have been originally in steps which are now generally reduced to a nearly uniform grade. In St. Thomas-in-the-Vale, the Liguanea gravels and loams were noticed at elevations between 300 and 400 feet. On the seaward side of Long Mountain, east of Kingston, the Liguanea formation rests unconformably upon the Layton series at an elevation of 150 feet.

Overlying the volcanic rocks and also the Layton marls, where not eroded upon the seaward side of the volcanic hills of Low Layton, the stratified Liguanea gravels occur. The formation was seen to an elevation of nearly 450 feet. This is illustrated in Figure 2, Plate V.

FIGURE 1.—Portion of the Plains of Liguanea behind Long Mountain whose base is dissected by the Hope *Canyon*.

FIGURE 2.—The Liguanea formation resting upon the eroded surface of the Layton Series at the volcano of Low Layton.

Some marls and coast limestones noticed farther west may be the local equivalents of the Liguanea loams and gravels. In the embayments of low plains entering the southwestern highlands, this formation seems to be quite extensively represented in the alluviums described by Mr. Brown. *On the northern side of the island, the development of the coastal plains is so slight that only fragments of the formation are there preserved. When seen by the writer, no fossils were found in the loams, although a few are reported in some "alluviums."

Comparison of Liguanea Series with the Zapata of Cuba, and the Lafayette of North America.—In Cuba, the Zapata red loams and gravels* of the same general character and development as the Liguanea, and occupying the same general position on the eroded surfaces of the Matanzas, equivalent to the Layton (or late Pliocene?) formation, appear to be the representatives of the Jamaican deposits.

So also the Columbia loams and gravels, covering 150,000 square miles of the Atlantic and Gulf states, as described by Prof. W. J. McGee,† appear to be the correlative of both the Liguanea and Zapata formations of Jamaica and Cuba. The same formation extends along the eastern side of Mexico to at least as far as the Tehuantepec Isthmus; and Gabb describes a formation in Santo Domingo that may be included here, and apparently the same formations occur in some of the Windward Islands. The Columbia and Lafayette formations are very widespread, and show some unequal elevations of the land, but no discordance in the succession of physical changes throughout the extent of their development, along the margin of the continent for at least 2,000 or 3,000 miles in length. So also the general uniformity, where known, throughout the encircled Antillean region has a similar character. Although the magnitude of the terrestrial oscillations varied somewhat, and may have commenced and ended earlier in one locality than in another, yet the Liguanea, Zapata and Columbia formations appear to be an expression for the same formation in separated localities.

That the Liguanea formation is very often seen well stratified at considerable elevation near the sea shore, seems sufficient evidence of its origin at sea level, as there could have been no barriers to exclude the oceanic waters, although marine fossil remains in it are not certainly established. In this respect, the character is identical with the Columbia formation of the continent. It is possible that some of the isolated

* "Geographical Evolution of Cuba," by J. W. Spencer. Bull. Geol. Soc. Am., vol. vii., pp. 67-94.
† Cited before.

marls with modern fossils seen on the north-western coast may belong to this series.

MODERN HISTORY.

Epoch of Elevation.—At the close of the Liguanea epoch, the land rose to an altitude of not merely the height of the Liguanea series, but to an elevation of 120 feet more. At this time an epoch of considerable erosion was commenced, which is characterized by all of the rivers leaving the highlands through freshly excavated *canyons*, where the streams are still deepening their channels. The *canyon* epoch was more recent than the Liguanea formation, as this last is dissected by them. The evidence of greater elevation than at present is preserved in the valleys and channels crossing the submerged shelf upon the southern side of the island. On the northern side, the evidence is scarcely available on account of the narrow submarine fringe; but in the little valley of Dry Harbour, which is submerged to a depth of over 200 feet with a bar in front of it less than 18 feet below the surface, which could easily be formed by coastal currents as the district has since been sinking, there may be evidence of somewhat greater recent depression than is recorded on the southern side of Jamaica. The occurrence of the large swamp formations at the mouths of many of the rivers, as well as the drowned channels, also indicates the depression subsequent to the modern post-Liguanea elevations of 120 (or 200) feet.

Hope River leaves the mountain regions opposite the northern end of Long Mountain (see Map, Figure 4, page 337), and its former course was over the Liguanea district, not apparently in modern days, but before the Liguanea epoch, during which time the channel became obstructed to an elevation of about 600 feet above the sea. Upon the post-Liguanea emergence, the Hope River turned across the neck of Long Mountain (see Figure 1, Plate V., page 349), and has since made a *canyon* three miles long. This neck was about 550 feet above the present sea level. The floor of the upper part of the gorge is now 150 feet deep, or about 400 feet above the sea. In the three miles it descends 300 feet and abruptly enters a broad valley. The width of the gorge at its base is from 50 to 75 feet, although it is often reduced to 20 feet (Figures 1 and 2, Plate VI.). This *canyon* represents the amount of post-Liguanea erosion, and throughout its length, it is excavated out of the "White Limestone." The post-Liguanea elevation was thus sufficiently long ago to permit of the formation of *canyons* three miles long, and from 150 to 500 feet deep.

All the other rivers crossing the "White Limestones" have similar

FIGURE 1.—Hope *Canyon*. The narrowest portion only about twenty feet wide along bed of stream.

FIGURE 2.—Hope *Canyon* (from 200 to nearly 500 feet deep). Excavated since the Liguanea period.

canyons, such as those along the streams shown in Map, Figure 4. Above the *canyon* sections, there are benches marking the former floors of the valleys, before the post-Liguanea uplift (as represented by the base levels shown in section at l.l., Figures 5 and 7, and z in Figure 1).

Terraces.—Remnants of terraces are common, but they are usually very much denuded by the tropical rains which may amount to ten inches fall within twenty-four hours. It is almost astonishing that any loams and gravels resist such washes. Under these conditions the torrents rise to great heights in the gorges, so that large boulders commonly five feet and occasionally ten feet in diameter are carried down the channels for many miles from their original beds.

Back of Kingston the Liguanea plain rises 350 feet in three and a-half miles, and near Hope Toll Gate to about 600 feet; but this is upon the edge of the delta of the Hope River, where it leaves the mountains. A short distance away, on the Mono estate, there is a beautiful terrace plain at 550 feet (bar.), and lower terraces at 500 and 460 feet. Below this level the river enters the *canyon*. These are true terrace steps, each marking the lowering of the base level of the erosion of the river. Through the *canyon*, which is more recent, there is no terrace, but at the lower end where it expands to a broad valley, another terrace at 150 feet is seen. The floor of the valley is here 100 feet above tide, but the bottom merges into lateral terraces of about the same height along the lower reaches. Other terraces at 50 and 25 feet also occur.

Terraces, corresponding to those of the broader parts of the Hope River valley, ought to be engraved upon the Liguanea plain, but they are only faintly recorded. These open plains which have been exposed not only to the tropical rains, but to the cultivation of 350 years, would naturally have the faces of the terraces, of which only the more striking have been noted along the Hope, graded down to a somewhat uniform slope; but even now some of these steps are still recognizable. On the southern end of Long Mountain, there is a bench cut in the White Limestone at an elevation of about 550 feet, corresponding in height to the Mono Terrace (at l l., Figure 5, page 344).

Along the line of the railway, west of Old Harbour, terraces of gravel, etc., were noticed at 275, 250, and 175 feet, and beyond Porus Station at 400 feet. Still farther, the Melrose valley appears to be a terrace floor protected in a cove among the mountains. In St. Thomas-in-the-Vale, back of Spanish Town, terraces are well shown at

altitudes of from 300 to 400 feet, but these may have been due to a dam near Bog Walk.

Along the Rio Grande, back of Port Antonio, remains of valley terraces were noticed at Unity Hall, Golden Vale, and near Windsor, at elevations up to nearly 275 feet; and along the Foxes, a tributary of the last stream, at 375 feet. Along the coast in this region, there are remnants of baseplanes or terraces at 50-60 feet. On the neck of the ridge connecting the Low Layton volcanic hills with the coast range where the road crosses between two streams, there are the remains of an old terrace at about 375 feet above the sea. At many points westward, there is a bench or terrace between 50 and 80 feet, as beyond Buff Bay and Montego Bay. Indeed, there is a fine terrace at the last named place at 50 feet, and several higher benches are engraved upon the point north-east of the bay. Along the northern side of the island, the lower bench of coast limestones commonly rises from 10 to 25 feet.

South of Montego Bay, along the Grand River, there is a broad valley, which, below Cambridge, has an altitude from 400 to 500 feet

FIGURE 8.—A rock island in Great River valley about 100 feet high.

above the sea. Here there are distinct terrace steps, showing the lowering of the base levels of erosion. In another valley, near Anchovy, there are terraces between 675 and 700 feet. Nearer the edge of the mountain region above the Bay of Montego, there are benches at corresponding heights.

In the valley of Great River, there is a peculiar feature in that there are many islands of rocks rising from 100 to 200 feet above the floor, which is from 400 to 500 feet above the sea. Some of them may be more than half a mile long, but many are shorter and comparatively narrow, occupying only a few acres. The sides are precipitous as shown in Figure 8. Their surfaces are substantially remnants of a previous floor of the valley (or base level, probably of Layton age), which must have been between 600 and 700 feet above the sea. A thin coating of

tufaceous deposit is common on these rock islands. Sea caves excavated in the walls of these islands were also seen. These terraces in part mark the pauses in the post-Liguanea elevation of Jamaica.

Coral Reefs.—As has been pointed out, the post-Liguanea elevation reached an altitude of 120 feet, or possibly 200 feet on the northern side, higher than now, as the streams cut channels to this depth, which have since been drowned, (see page 350). Then followed the episode of depression to about 25 feet below the present altitude, when coral reefs and modern limestones began to be formed, which since then have been raised from 10 to 25 feet, or locally more. The narrow reefs occupy a considerable portion of the coast line on the northern side of the island, and were specially studied to beyond Montego Bay. Where the corals form the coast line, there are no beaches, except in coves. The floor of Montego Bay is covered with a beautiful garden of corals, of both massive and branching varieties. In part, the coral reefs which are raised to form the coast limestone, may be replaced by shell beds (Brown), and it is possible that some of the low fossiliferous shell bearing marls seen west of Montego Bay belonged to this modern episode, that is those beds which were not succeeded by other late formations. Still some of the coast limestones are the remnants of the older formations, such as those near Orange Cove and Hopewell.

Beaches.—The formation of the beaches is an interesting feature, as they are the exact reproduction of the deserted beaches of the Great Lake region of North America, but unlike the sandy Atlantic beaches at least south of New York, and many other places noticed north-east of that city. They form ridges from three to five feet above the sea, with depressions behind them, and in composition they are made up of sand and gravel, often somewhat coarse, derived from the harder portions of the White Limestones, or older rocks brought down by the streams. Along the Atlantic coast, all of the gravel has been ground to sand or very fine material, before reaching the present coast, and the beach ridges are not so sharply defined as in Jamaica. The Jamaican ridges appear to be due in part to the presence of the gravel in large quantities, and also to the almost complete absence of tides. In the Lake region the gravel has been derived from the boulder clay. The ridges are often not more than 25 feet, or they may be 200 feet across their crests. They are well developed between Hope Bay and Low Layton volcano, also west of Buff Bay and at Annatto Bay. West of Buff Bay a good representative of raised beaches may be seen.

Another interesting beach is that in front of Kingston Harbour,

(Figure 4, page 337), which is called the "Palisades," with a length of about eight miles. The depth of the water inside reaches to 60 feet. Before the district sank subsequent to the post-Liguanea elevation, Kingston Harbour was only a continuation of the Rio Cobre. When the land was depressed so that the coast line occupied the location of the eastern end of the beach, a bar was thrown across the valley, and the beach slowly developed as the land continued to sink. The mouth of the harbour was subsequently changed to the present outlet.

Alluvium.—Owing to the late elevation of the land, the slopes of the streams have not been reduced sufficiently to allow the deposition of much alluvium along their courses. However, at the mouths of many of the rivers, especially along the southwestern end of the island, there are extensive marshes. Indeed, from their broad character, a late subsidence seems to have occurred, if not in progress at present. The sinking of Port Royal (at the end of the Kingston Palisades) in 1697, from earthquake action cannot be taken as evidence of changes of level of the coast line.

A Review of Erosion Features since the Miocene Period.—The features of denudation have formed prominent diagnostics in the present researches, and consequently had to be separated and partly considered in several connections. In these erosion features, the records of the history of the land are as clearly told, as in the fossils is the history of the sea. Owing to changing conditions from terrestrial to marine, and back again, both departments of geology have to be considered, and each makes the other study the more valuable. The Mio-Pliocene denudation was enormous, but it was effected with the land near the base level of erosion. This condition need not imply that the land was actually low, but the sea may have been much farther from the modern plateau than now, as is suggested from the submarine banks, only in the elevation of the land Jamaica may have been abnormally lifted above the now submerged plateau; and the seaward margins, from which even the "White Limestones" had been mostly denuded, were depressed. Since the early Miocene period, the "White Limestones" themselves have been raised 3,000 feet. The Mio-Pliocene period was one of erosion affecting the island beyond its present margins; and this long period of denudation was ended by the Layton submergence. The post-Layton degradation, (that is the early Pleistocene), was also of considerable duration, and represented very great elevation with the formation of deep valleys, but the country was not ground down to the base level of denudation as during the long Mio-Pliocene elevation. The later, or post-Liguanea, erosion has been

of vastly smaller proportions than the previous, and is represented by the *canyons* not yet widened into valleys. The higher mountains are covered with deep soil, the result of the decay of the rocks. This loose material subjected as it is to the heavy tropical rains washing the very steep slopes, suggests that they must have been thrust abnormally high in very recent times, for such material could not long resist the atmospheric action. The descent of the mountain streams may be from 500 to 1,000 feet in a mile.

Faulted (?) Basins.—On referring to the map, (Figure 6, page 345), the belt of White Limestones, from 700 to 1,000 feet in altitude above the sea, occurs in front of several deep valleys. The higher portions of these valleys correspond to depressions across the limestones, but the lower portions are too low, and yet so large that they could hardly have been excavated since the *canyons* have cut through the White Limestone belt, which rises from 200 to 500 feet above the inner valleys. It is suggested that these valleys, although erosion depressions, have been obstructed by recent faultings. The feature is repeated in Cuba, where the writer found the evidence of very late faulting, which brought up the barrier in front of the large Yumuri Valley, near Matanzas.

St. Thomas-in-the-Vale is a valley about six miles long and from three to five broad, and surrounded by high mountains. At its upper end it has an elevation of 700 or 800 feet, which gradually declines, so that near Bog Walk it is not more than 300 feet above the sea. It is plainly an erosion valley, from which the higher portions could have been drained across the depression in the mountains back of Spanish Town, yet such could not have been the case with the lower level that is now drained by a narrow post-Liguanea *canyon*. Some have regarded it as having been drained by underground channels. But for such a large valley, this explanation seems somewhat inadequate, and its origin by the uplift of the mountain barrier to the south, accompanied by faulting, is suggested.

The Terrestrial Oscillations.—Complex as it may seem, there have been numerous oscillations since the early Tertiary days. After the abysmal subsidence of the Pteropod marls, about the early Miocene days, the elevation did not culminate until in the early Pleistocene, when it reached 7,000 to 10,000 feet, as shown by evidence adjacent to the island. The Mio-Pliocene elevation was of moderate porportions, with the Layton submergence, of a few hundred feet, about the close of the Pliocene period. Then the great post-Layton elevation was succeeded by a depression of the land to a few hundred feet lower than now; another

considerable upward oscillation of 120 to 200 higher than now occurred, with the following depression a few feet lower than now ; again a slight elevation represented by the modern raised Coral reefs, but we do not say whether the movement of the present day is one of rising or sinking. Thus we absolutely find, commencing with the Mio-Pliocene broad lands, no less than four epochs of elevation separated by those of subsidence. But most of these movements have been of small amounts, every one in each direction having reached gigantic proportions. These numerous terrestrial changes are also recorded in Cuba and on the Continent.

TABLE OF THE GEOLOGICAL SUCCESSION AND OSCILLATIONS IN JAMAICA.*

SYSTEMS.	FORMATIONS AND THEIR MOVEMENTS.
Modern	Modern coral terraces; elevation 10 to 25 feet. Formation of coralline limestones; submergence 10 to 25 feet. Formations of channels over banks; elevation 120 (+) feet, equals maximum modern elevation; *canyon*-making epoch. Formation of terraces; submergence 550 (+) feet, (representing post-Liguanea emergence).
Pleistocene	Liguanea formation (red loams and gravels); subsidence 600 (+) feet. Unconformably on various formations. Post-Layton elevation; an epoch of enormous erosion; altitude from evidence within the submerged Jamaican plateau, from 7,000 to 11,000 feet; Strata not deformed at this time, but with the mountains higher than in the earlier periods. Great deep valleys.
Pliocene.....	Layton formation (marly beds, and also loams and gravels); subsidence 450 (+) feet. Unconformable on White Limestones, etc. Pliocene, or Mio-Pliocene elevation; an epoch of long duration and great amount of erosion; altitude inferior to that in the post-Layton elevation, but high enough for the removal of the Miocene limestone below sea-level. This was a period of general elevation of the land, and erosion to broad base-levels.
Miocene and Eocene....	Series not physically separable, and the upper beds may be entirely removed; no beds newer than the older Miocene remain. The prominent beds constitute the "White Limestones" with a thickness of 2,000 feet; subsidence 3,000 feet; Foraminiferal marls occur below the "White Limestones."
Eocene, Cretaceous, and perhaps older formations.....	Slates, sandstones, conglomerates, limestones, igneous and metamorphic rocks constituting the dislocated basement of the "White Limestones" of the interior of the island.

* Altitudes refer to elevations above or depressions below sea level.

RESEMBLANCES BETWEEN THE DECLIVITIES OF HIGH PLATEAU AND THOSE OF SUBMARINE ANTILLEAN VALLEYS.

By J. W. Spencer, M.A., Ph.B.

(Read February 5, 1898).

In the "Reconstruction of the Antillean Continent,"* the writer brought together a vast number of data showing that everywhere crossing the southeastern coastal plains of North America, the rivers flow over deeply-buried ancient channels before entering the sea, thus indicating a submergence of the land. The direction of these rivers is mostly transverse to the mountain range as well as to the coast lines. Beyond the sea shores, and amongst the West Indian Islands, there are extensive submarine plateaus, regarded as Mio-Pliocene plains, now submerged at various depths between 2,500 and 5,000 feet. These are dissected by fjords, or drowned valleys, of great depth, which are found to be continuations of the land valleys. They are traceable to depths of more than two miles, and receive tributaries converging from all possible directions. These submerged river systems are recognizable in all portions of the Antillean basins, and the more important of them are described in the "Reconstruction of the Antillean Continent." They are shown upon the accompanying map.

In the previous paper on "Late Formations and Great Changes of Level in Jamaica,"† the drowned plateaus adjacent to that island, and their dissection by the deep channels, are described. The phenomena show the recent extension of continental lands so as to include the Jamaican mass, as illustrated on the accompanying map. The dissection of these plateaus is of much more recent date than the formation of the drowned plains. Upon the adjacent lands these channels dissect the Lafayette formation of America, the Matanzas of Cuba, and the Layton of Jamaica, which appear to be local equivalents of widespread accumulations, resting unconformably upon the old Mio-Pliocene land surfaces; consequently, these drowned *canyons* and deep

* Bull. Geol. Soc. Am., vol. vi., pp. 103-140. 1894.

† Trans. Can. Inst., vol. v., pp. 325-357, 1898.

from the earlier Pleistocene epoch, even if in part they pe of greater age, refilled with these last named deposits, which ere largely carried away by subsequent denudation during the epoch great elevation.

In the original paper on the "Reconstruction of the Antillean Con ," the declivities of the land valleys were scarcely compared with se drowned beneath the sea. Indeed, in order to draw the analogy was necessary to make a study of the slopes of the valleys dissecting margins of the high table-lands of Mexico* and the Western States, and such comparison is offered in the following pages.

In the Appalachian mountains some of the valleys are from ten to venty miles across, occupying in places anticlines in the structure of formations, or extending over many anticlines and synclines alike, or crossing the trends of the beds, for there the strata are usually much ded or upturned. The valley of Lookout Creek varies from two to ur miles in width, and it is bounded by table-lands from 500 to 1,000 feet above it. Even at the divide between its head and that of Will's Creek, flowing in the opposite direction, its breadth is more than two miles, and the bounding escarpments 500 feet high. The average declivity of the valley is over ten feet per mile.

The Mississippi system is a representative of great streams flowing over a continental plain, which is now so reduced in height above the sea level, that there is comparatively little deepening of the channels, and indeed, the valleys of all the larger branches are more or less deeply silted over with river deposits. Above the mouth of the Ohio, the Mississippi River flows through a valley from three to eleven miles wide, bounded by rocky escarpments, commonly of limestone, rising from 100 to 500 feet above the floor. The length of this reach is about 700 miles, although over 800 miles, if the winding of the valley be more closely followed. The mean gradient of this section is six-tenths of a foot per mile. From the mouth of the Ohio River to the Gulf of Mexico, the direct distance is 550 miles, although the river is twice as long. The mean slope of this portion of the valley is five-tenths of a foot per mile, while that of the river is only half as much. The Mississippi River now flows over a buried valley, the floor of which is from 100 to 200 or 300 feet below its surface, so that the declivity of the ancient channel below the mouth of the Ohio is over one foot per mile. The river throughout this portion of its course, wanders over alluvial flats from forty to eighty miles wide, and

* "Great Changes of Level in Mexico and the Interoceanic Connections." Bull. Geol. Soc. Am., vol. ix., pp. 13-34 1897.

these flood-plains are bounded by high bluffs of soft or incoherent rocks of Cretaceous and early Tertiary ages, and later superficial deposits, in contrast to the hard Paleozoic formations of the upper section of the valley. The difference of width of the upper and lower portions of the valley is mostly due to the rainfall acting upon the more readily yielding strata during a long period of base level of erosion. The lower part of the buried valley reaches to the great depth of about 1,000 feet below the Gulf of Mexico.* If the region should further subside† by 300 feet, the river would become an estuary like that of the St. Lawrence.

The Colorado River of the West forms another type of valleys. It flows from elevated plateaus, some of which have altitudes of 8,000 or 10,000 feet above the sea. From Echo Cliff, the Marble *canyon* extends sixty-six miles to the mouth of the Little Colorado River, below which the gorge of the Grand *canyon* reaches 195 miles to Grand Wash, but the *canyon* is twenty-five miles longer. The gradient of the river is commonly between seven and eight feet per mile, although reduced in parts to five feet, or increased to twelve feet in others, and locally it is nowhere more than twenty-five feet. The mean slope is accordingly 8.5 feet per mile. (These slopes are illustrated in figure 2, page 364). The inner *canyon* may have a breadth equal to the depth, or from 3,500 to 4,000 feet, but the outer *canyon* has a width of from five to over twelve miles, with bounding escarpments 2,000 feet above the higher floor. The outer valley suggests that the region was at a lower base level, when the altitude could not have been at more than a slight elevation above the sea, like that of the modern Mississippi valley.

The gorge of the Niagara River is seven miles long, and although the volume of water is very large, the mean declivity is about sixteen feet per mile ; but locally there are great rapids and eddies.

Equally important, with the study of the slopes of the great valleys and rivers, is that of the gradients of their short tributaries. These are often hardly more than stupendous washouts, forming great amphitheatres. The gradients of these short valleys may be from 400 to 600 feet per mile for a few miles, but this is greater near its head, and less along its lower portions. The declivity is never less than 200 feet per mile (Dutton‡).

---

* The depth has long been known to exceed 600 feet, but lately Mr. E. L. Corthell has found by borings that it reaches to about 1,000 feet.

† Mr. Corthell has also found that the region about New Orleans is sinking at the rate of five feet a century. "Geographical Development of the Lower Mississippi." Communicated to the British Association, Toronto, 1897.

‡ The measurements were taken from the "Tertiary History of the Grand *Canyon* District" (of the Colorado of the West), by C. E. Dutton (1882).

Another class of valleys may be seen between Vera Cruz and the edge of the table-land, by following the route of the Mexican railway from the coastal plain, just below Atoyac, to Esperanza, a town situated upon the margin of the plateau, at an elevation of 8,000 feet above the sea. The section is shown in figure 5, page 365, or on a scale less vertically exaggerated in figure 1. The valley may be considered as an

FIGURE 1.—Section between Esperanza and Atoyac, showing the descent of the valley by gradation steps, or a succession of base levels of erosion.

abrupt incision in the floor of the plateau. It is about forty miles long, although the railway has a much greater length on account of its windings. The upper four miles, forming the amphitheatre heading the valley, have a mean descent of about 600 feet per mile (although the uppermost mile represents a descent of a thousand feet). If reaches of eight or ten miles be taken, the mean slope is 150 feet per mile, except below the city of Orizaba, where the declivity is about half as great. The analysis of the slopes shows that they consist of very gently declining, or almost level, steps, with abrupt frontal margins. Often several steps coalesce so that, in places, they form one, several hundred feet in height. In such cases, the platforms are dissected by short *canyons*, such as may be seen at Atoyac, near Fortin, below Maltrata, and at other places. The *canyons* characterizing the edges of the steps, or terraces, are narrow and deep, and they are less than half a mile long, representing the small amount of work since the last elevation of the late base level of erosion.

The more or less buried valleys crossing the coastal plains of the southeastern part of the continent are frequently from two to four miles wide, at distances of 100 or 200 miles from their mouths, and from six to ten miles wide upon nearing the coast, which varies from fifteen to nearly 300 miles from the edge of the continental shelf. It has been already stated that the Mississippi valley is from forty to eighty miles wide, and that the upper terrace plain of the Grand *canyon* of the Colorado is from five to twelve miles wide, with bounding escarpments 2,000 feet high. The St. Lawrence is a partly drowned valley, seventy miles wide for the last hundred miles of its course, before reaching Anticosti Island, and about thirty miles in breadth for the next hundred

miles above. It is reduced to fifteen miles in width only, near the mouth of the Saguenay, which is 325 miles above Anticosti.

Upon the edge of the continental plateau, the Bahaman Channel (extending from the Straits of Florida, along the northern side of the Bahama Islands*) or drowned valley, has a breadth of seventeen miles, (although its depth is 11,898 feet) where the adjacent shelf is submerged 5,650 feet. The deeper part of the drowned valley of the Mississippi has a breadth of twenty. The broader plain-like floors of the Floridian Channel (the drowned valley extending from the shallowest part of the Straits of Florida to the floor of the Gulf of Mexico. See Map), are rarely forty miles wide, and the deeper ones may be reduced to ten miles. Among the Bahama banks, the deep valleys have a breadth of ten or fifteen miles, while the broader and shallower portions near the surface of the sea may reach from forty to sixty miles in breadth. There are numerous short amphitheatres, indenting the margins of the submarine plateaus, which relatively have no greater magnitudes and declivities than their counterparts which are tributary to the Colorado, or others indenting the margins of the Mexican table-lands.

From a vast number of examples studied, of which these given are only types, the conclusion is that the magnitude of the submerged valleys under the varying conditions is no greater than that of the valleys upon the surface of the continent.

The gradients of the submarine valleys, if considered without their analysis, would be wholy misleading, just as it would be to suppose a uniform descent for the valleys dissecting the border of the Mexican table-lands. Of the various submerged valleys, the Floridian channel offers one of the most complete subjects for study, and its slopes are illustrated in figure 2. For purposes of comparison, the declivites of the Floridan valley, and those of two other valleys (figures 5 and 6), descending from the table-lands of Mexico, are drawn to the same scale as shown on a following page, but the scale of the land valleys is too small to illustrate the numerous terrace steps. Other examples of the submarine gradients are shown in the sections of the Bahaman and Abacan (figure 3), and Cazonan (figure 4), channels, the last of which in magnitude closely resembles the Atoyac valley. If the declivities of the valleys, descending from the Mexican plateau be taken as a whole, the slopes will be observed to be more precipitous than the greater steps now known in the descent of the Floridian channel, or of the channels amongst the Bahamas.

*See Map reproduced from the "Reconstruction of the Antillean Continent," opposite page 357.

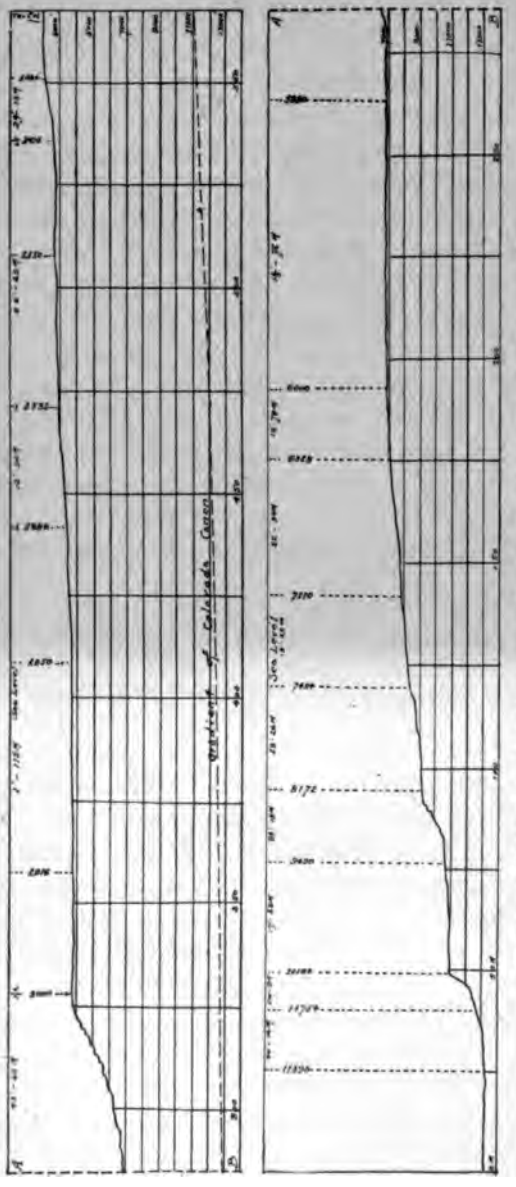


FIGURE 2.—Section of the Floridian Valley (the two parts to be joined at the broken line A B.).

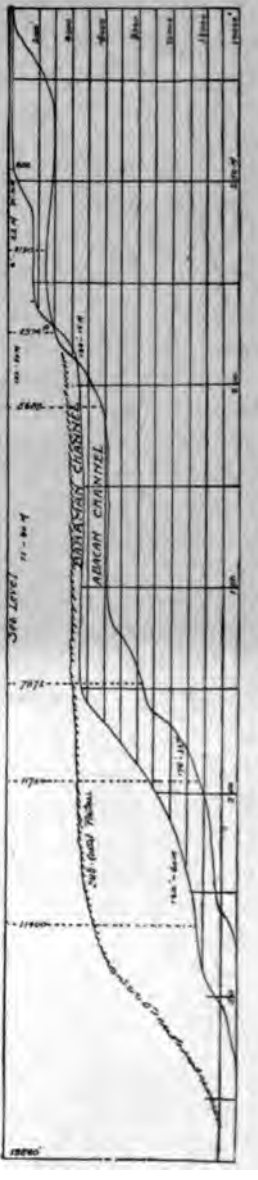


FIGURE 3.—Sections of the Bahaman and Abacan Channel.

Figures 2 and 3 illustrate the descent of three great channels rom the *col* of the Straits of Florida to the floors of the Mexican and Atlantic basins, (for their locations see Map). They show a succession of steps like great base levels separated by precipitous slopes. The soundings have been made where the figures are shown in feet. The gradients are given in feet, for distances expressed in miles. The descent of the Colorado *canyon* is illustrated in figure 2.

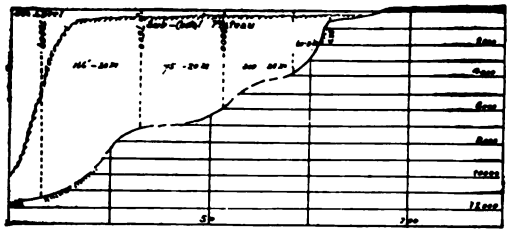


FIGURE 4.—Sections of the submerged Cazonan valley (south of Cuba). It is much shorter than the other sections shown, and somewhat resembles a great ampitheatre.

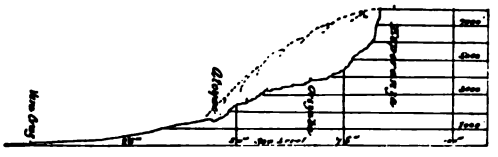


FIGURE 5.—Section showing the descent of the valley descending from the Mexican plateau and emerging on the coastal plains at Atoyac.

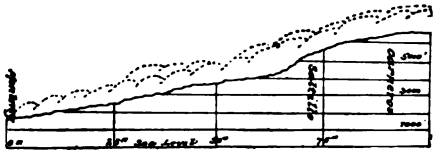


FIGURE 6.—Section of a Mexican valley descending to Monterey.

These sections of valleys descending from the Mexican plateaus are drawn on same scale as those submerged. The sections of submerged and land valleys are here brought together for purposes of comparison.

The long reaches of the Floridian Channel resemble base levels, and may be seen to have much more gentle slopes than those of the Colorado *canyon* (shown on Figure 2). Indeed, some of the drowned stretches have gradients as low as, or even lower than those of the buried channel of the Mississippi. Thus along portion of figure 2, for a distance of 115 miles, the gradient is only one foot per mile; and along another part, for 65 miles, the declivity is reduced to six-tenths of a foot. Even on the abrupt slopes between the nearly level reaches, for example a distance of 65 miles, the descent averages only 43 feet per mile; and if the Mexican valleys can be taken as guides in interpreting the submarine features, it is probable that more detailed soundings would show the descent of the floor to be made up of almost level reaches separated by steps more precipitous than those shown. Comparing this drowned valley with the valley above Atoyac, it may be observed that for stretches of eight or ten miles, the mean descent of all the

steps of the land valleys amounts to 150 feet per mile, and for the last four miles, at the head of the amphitheatre even 600 feet per mile. Similar declivities have also been pointed out among the tributary amphitheatres of the Colorado River. The slopes of the drowned valleys (as illustrated in figures 2 and 3), are thus seen to be a succession of flat reaches, like base levels, and the margins of all are characterized by steep slopes in all respects resembling the land valleys, (figures 5 and 6) descending from high table-lands. The great stretches of low gradients found amongst the drowned valleys, agree more or less with the submerged plateaus, and appear to have been formed when they were at base level of erosion, before their subsidence.

If the Mississippi valley were elevated, the processes of *canyon* and valley making would gradually dissect the margins of the newly elevated table-land. Such appears to have been the case, at the time of the formation of the now buried valley, discovered near New Orleans to a depth of 1,000 feet. On the other hand, if the Mexican plateau were reduced to base level, the valley above Atoyac would be a short fjord, like that of the Gulf Cazonas (Figure 4), or like the buried valleys of the lower Mississippi.

If the analogy be complete enough, and numerous other phenomena could be further cited in support of it, a most important geological history can be interpreted from the submarine valleys. It has been found that terrestrial movements are not uniform; and although over some continental regions the variation has been so slight as not to disturb the course of the drainage, in others it has been affected. In some cases barriers have been thrown across the valleys by the warping or tilting of the earth's crust; such as that closing Lake Ontario and other lakes and confined sea basins. The greatest amount of terrestrial movement occurs in the mountain regions; and the least on the plains. There are also indications that the greatest rate of depression takes place upon approaching the oceanic abysses. These exaggerated movements named are usually parallel to mountain ranges, and consequently most of them are transverse to the courses of the submerged valleys, and consequently the terrestrial oscillations have not materially affected their depths, though they may have somewhat increased their slopes; yet not to so great an amount as to prevent the depths of the valleys dissecting the submarine plateaus (and producing banks and islands) from being used as yard sticks for measuring the extent of changes of level of land and sea. In the valleys parallel to the mountain folds, it appears that the terrestrial movements have given rise to deep basins.

The valleys beneath the Antillean seas have, in part, been excavated out of disturbed strata, as is suggested by the exposures of the formations on the adjacent islands, and also in part out of undisturbed beds, which last occurrence is generally the case on the coastal plains of the continent. The formations immediately adjacent to the drowned valleys belong everywhere to late geological periods.

The characters of the submarine valleys—in their magnitude; in their declivity; in their being extensions of existing rivers; in their receiving tributaries from various directions, like modern streams; and in the long reaches of their floors, with low gradients, resembling gradation plains and base levels of land valleys—are so strongly analogous to land features, as to more than indicate their common origin. Indeed, the likeness is so strong as to suggest a satisfactory explanation of the submarine valleys off the south-eastern coast of North America, and those of the West Indies, that is to say, they appear to be drowned valleys of atmospheric origin. With the occurrence of the submerged valleys thus explained, it follows as a conclusion that the West Indian region and the margin of the continent stood once nearly as high as the drowned valleys are traceable, which feature extends nearly to the floors of the Antillean basins. This implies a late elevation of the region to a height of two or three miles, which altitude is greater than that generally assumed in late geological times. But the recent extraordinary depression of the Antillean plateau does not extend to the western boundary of the region. Between the east and the west there was a zone of diminished terrestrial movements. The broad valley which is now the floor of the Gulf of Mexico, has its counterpart setting into the continent from the Pacific side, but the Mexican barrier between the two oceans has only been recently elevated—in part to 8,000 or 10,000 feet. This seems then to be a physical compensation for the sinking of the Antillean plateau of the east, and illustrates stupendous movements in the opposite direction, in late geological times.

Many writers have regarded the West Indian Islands as remnants of mountain ranges submerged, but no standard was found for measuring the amount of depression, until the application of geomorphy to the drowned valleys was suggested by the writer. It might have been formerly supposed that the West Indian basin alone sank, while there was no considerable change of continental elevation; but such a hypothesis is now opposed by the analysis of the character of the valleys. Nor have ocean currents greatly deepened the channels, for even the

cols beneath the Gulf stream are hundreds of feet above the submarine plateaus on both sides of it. To that channel there are several tributaries from directions which oceanic currents could not affect.

Lyell, the great geological teacher, impressed upon his followers the instability of the land and sea. The drowned valleys are only measuring sticks for determining the amount of change.

Transactions

—OF—

The Canadian Institute.

No. 7.] MARCH, 1894. [Vol. IV. Part 1.

Toronto:

THE COPP, CLARK COMPANY, LIMITED

1894.

PRICE - $1.00.

CONTENTS.

NOTES

ARCHAEOLOGICAL, INDUSTRIAL AND SOCIOLOGICAL,

ON THE

WESTERN DÉNÉS.

REV. A. G. MORICE, O.M.I.

ERRATUM.

Volume III., page 284, lines 12 from top and 2 from bottom, for *Gibbs* read *Gipps*

OFFICERS, 1893-94.

President:

PROF. R. RAMSAY WRIGHT, M.A., B.Sc.

1st Vice-President:

J. C. HAMILTON, M.A., LL.B.

2nd Vice-President:

B. E. WALKER, Esq.

Secretary:

ALAN MACDOUGALL, M. Inst., C.E.

Treasurer:

JAMES BAIN, Jr., Esq.

Librarian:

D. R. KEYS, M.A.

Curator:

DAVID BOYLE, Esq.

Editor:

GEORGE KENNEDY, M.A., LL.D.

Members of Council:

O. A. HOWLAND, Esq.
L. J. CLARK, Esq.
ARTHUR HARVEY, Esq.
JOHN MAUGHAN, Esq., *Chairman Biological Sec.*
W. CANNIFF, M.D., *Chairman Historical Sec.*
PROF. A. P. COLEMAN, M.D., *Chairman Geological & Mining Sec.*

Assistant Secretary and Librarian:

R. W. YOUNG, M.A.

MAR 27 1939

Transactions

— OF —

The Canadian Institute.

No. 8.] DECEMBER, 1895. [Vol. IV., Part 2.

Toronto:
The Copp, Clark Company, Limited.
1895.

PRICE - $1.00

CONTENTS.

PAGE.

ABSTRACT OF MINUTES 223

FORTY-FOURTH ANNUAL MEETING 241

FORTY-FOURTH ANNUAL REPORT 245

THE BLACKFOOT INDIANS.
Rev. John MacLean, M.A., Ph.D 249

BUDDHIST INSCRIPTIONS OF INDIA.
Rev. John Campbell, LL.D 261

JOURNAL OF CAPT. WALTER BUTLER.
Capt. Ernest Cruikshank 279

MEMOIR OF CAPT. WALTER BUTLER.
Capt. Ernest Cruikshank 284

EARLY TRADERS AND TRADE ROUTES.
Capt. Ernest Cruikshank 299

MEMORABLE EPOCH IN CANADIAN HISTORY.
Sandford Fleming, LL.D., C.M.G. 314

THE OSSIANIC CONTROVERSY.
Rev. Neil MacNish, B.D., LL.D. 319

NIAGARA LIBRARY.
Janet Carnochan 336

AMALGAMATION PROCESS.
Robert Dewar 357

OFFICERS, 1895-96

President:

PROF. A. B. MACALLUM, M.B., PH.D.

1st Vice-President:

J. C. HAMILTON, LL.B.

2nd Vice-President:

B. E. WALKER, Esq

Secretary:

ALAN MACDOUGALL, M. CAN. SOC., C.E.

Treasurer:

JAMES BAIN, JR., Esq.

Librarian:

D. R. KEYS, M.A.

Curator:

JAMES R. FLEMING, Esq.

Editor:

GEORGE KENNEDY, M.A., LL.D.

Members of Council:

ARTHUR HARVEY, Esq.
DANIEL CLARK, M.D.
G. G. PURSEY, Esq.
JOHN MAUGHAN, Esq., *Chairman Biological Sec.*
O. A. HOWLAND, Esq., *Chairman Historical Sec.*
PROF. A. P. COLEMAN, PH.D., *Chairman Geological & Mining Sec.*

Assistant Secretary and Librarian:

R. W. YOUNG, M.A.

Stanford Library
MAR 27 1939

Transactions

—OF—

The Canadian Institute.

No. 9.] OCTOBER, 1896. [Vol. V., Part 1.

Toronto:
The Copp, Clark Company, Limited.
1896.

PRICE - $1.00

CONTENTS.

PAGE

Three Carrier Myths 1
REV. FATHER MORICE, O.M.I.

The Fluctuations of Lake Ontario 37
KIVAS TULLY, C.E.

The Gesture Language of the Blackfeet 45
REV. JOHN MACLEAN, M.A., PH.D.

The Climate of Alberta 49
R. F. STUPART.

Aboriginal American Inscriptions in Phonetic Characters. (With Plates) 53
JOHN CAMPBELL, LL.D., F.R.S.C., ETC.

Wales and Its Literature 64
NEIL MACNISH, B.D., LL.D.

The Fur Trade, 1783-7 74
CAPT. E. CRUIKSHANK.

A Review of Carvalyn Gailckagh or Manx Carols 83
NEIL MACNISH, B.D., LL.D.

The Celt in Ancient Egypt and Babylonia 89
JOHN CAMPBELL, LL.D.

The Seasons—Hudson's Strait 104
F. F. PAYNE.

Picture-Writing of the Blackfeet 114
REV. JOHN MACLEAN, M.A., PH.D.

Rainfall and Lake Levels 121
R. F. STUPART.

The Blackfoot Language *(To be Continued)* 128
REV. JOHN MACLEAN, M.A., PH.D.

ERRATA.

Page 109, lines 9 and 32, } for "1896" read "1886."
Page 110, line 3, }
Page 110, line 28, for "1895" read "1885."
Page 112, line 28, dele. "below zero."

OFFICERS, 1896–97

President:

PROF. A. B. MACALLUM, M.B., PH.D.

1st Vice-President:

J. C. HAMILTON, LL.B.

2nd Vice-President:

B. E. WALKER, Esq.

Secretary:

ALAN MACDOUGALL, M. Can. Soc., C.E.

Treasurer:

JAMES BAIN, Jr., Esq.

Librarian:

D. R. KEYS, M.A.

Curator:

JAMES R. FLEMING, Esq.

Editor:

GEORGE KENNEDY, M.A., LL.D.

Members of Council:

ARTHUR HARVEY, Esq.
DANIEL CLARK, M.D.
G. G. PURSEY, Esq.
JOHN MAUGHAN, Esq., *Chairman Biological Sec.*
PROF. A. P. COLEMAN, PH.D., *Chairman Geological & Mining Sec.*
W. A. SHERWOOD, Esq.

Assistant Secretary and Librarian:

ESTHER DE BEAUREGARD, B.A.

Stanford Library
MAR 27 1939

TRANSACTIONS

OF THE

Canadian Institute.

No. 10.] MAY, 1898. [Vol. V., Part 2.

Toronto:
MURRAY PRINTING COMPANY,
1898.

PRICE, - - $1.00.

CONTENTS.

PAGE.

THE DÉNÉS OF AMERICA IDENTIFIED WITH THE TUNGUS OF ASIA.
Rev. John Campbell, LL.D..... 167

SPATIAL THRESHOLDS OF COLOURS.
W. B. Lane, B.A..... 225

JOSEPH BRANT IN THE AMERICAN REVOLUTION.
Capt. Ernest Cruickshank..... 243

THE GAMETOPHYTE OF BOTRYCHIUM VIRGINIANUM.
Edward C. Jeffrey, B.A..... 265

THE PICTS.
Rev. Neil MacNish, B.D., LL.D 295

THE FUNCTION OF INDIRECT VISION.
A. Kirschmann, Ph.D..... 305

COUNTING AND TIME RECKONING.
John Thorburn, LL.D..... 311

LATE FORMATIONS AND GREAT CHANGES OF LEVEL IN JAMAICA.
J. W. Spencer, M.A., Ph.D..... 325

HIGH PLATEAU AND SUBMARINE ANTILLEAN VALLEYS.
J. W. Spencer, M.A., Ph.D..... 359

SPECIAL NOTICE.

The Council of the Canadian Institute regret to learn that some of the recent publications of the Institute, although mailed in the usual way, have failed to reach their destination, in particular, so far as can be ascertained, the following numbers :—

TRANSACTIONS,	No. 9	October, 1896.
PROCEEDINGS,	No. 1	February, 1897.
"	" 2	May, 1897.
"	" 3	September, 1897.

Members and Exchanges will please, immediately on receipt of this Notice, inform the Secretary by letter or post card, which, if any, of the above numbers they have not received, so that the Institute may supply those missing so far as may be possible.

As 1899 will be the Semi-Centennial Anniversary of the foundation of the Institute, it is in contemplation to issue a special Memorial Volume appropriate to the occasion.

OFFICERS, 1898-99.

President:
B. E. WALKER, Esq.

1st Vice-President:
JAMES BAIN, Jr., Esq.

2nd Vice-President:
DANIEL CLARK, M.D.

Secretary:
R. F. STUPART, Esq.

Treasurer:
WILLIAM SCOTT, M.A.

Librarian:
JOHN SQUAIR, M.A.

Curator:
C. H. ARMSTRONG, Esq.

Editor:
GEORGE KENNEDY, M.A., LL.D.

Members of Council:
JOHN MAUGHAN, Esq., *Chairman Biological Section.*
A. P. COLEMAN, Ph.D.
A. B. MACALLUM, M.B., Ph.D.
W. H. ELLIS, M.A., M.B.
G. G. PURSEY, Esq.
ARTHUR HARVEY, Esq.

Assistant Secretary and Librarian:
MARGARET J. LOGAN.

Physics

Stanford University Libraries
3 6105 025 419 446

CECIL H. GREEN LIBRARY
STANFORD UNIVERSITY LIBRARIES
STANFORD, CALIFORNIA 94305-6004
(650) 723-1493
grncirc@sulmail.stanford.edu
All books are subject to recall.

DATE DUE

SEP 2 4 2003
JUN 2 4 2003

MAR 2 9 2004
JUN 3 0 2004

611789

OFFICERS, 1898-99.

President:

B. E. WALKER, Esq.

1st Vice-President:

JAMES BAIN, Jr., Esq.

2nd Vice-President:

DANIEL CLARK, M.D.

Secretary:

R. F. STUPART, Esq.

Treasurer:

WILLIAM SCOTT, M.A.

Librarian:

JOHN SQUAIR, M.A.

Curator:

C. H. ARMSTRONG, Esq.

Editor:

GEORGE KENNEDY, M.A., LL.D.

Members of Council:

JOHN MAUGHAN, Esq., *Chairman Biological Section.*
A. P. COLEMAN, Ph.D.
A. B. MACALLUM, M.B., Ph.D.
W. H. ELLIS, M.A., M.B.
G. G. PURSEY, Esq.
ARTHUR HARVEY, Esq.

Assistant Secretary and Librarian:

MARGARET J. LOGAN.

CECIL H. GREEN LIBRARY
STANFORD UNIVERSITY LIBRARIES
STANFORD, CALIFORNIA 94305-6004
(650) 723-1493
grncirc@sulmail.stanford.edu
All books are subject to recall.

DATE DUE

SEP 2 4 2003
JUN 2 4 2003

MAR 2 9 2004
JUN 3 0 2004

611789